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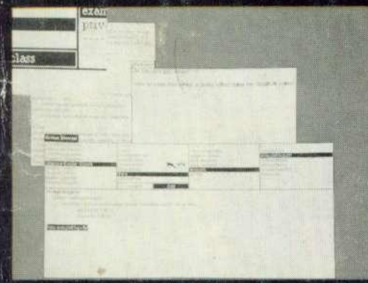
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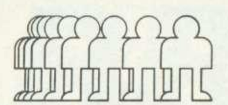


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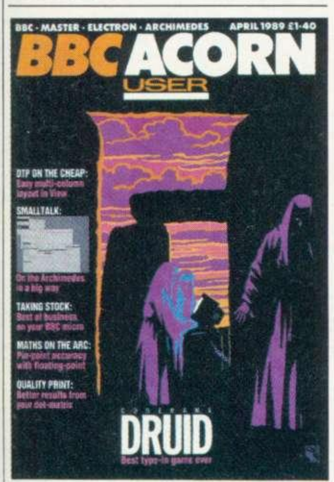
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BBC ACORN USER

ISSUE NO 81 — APRIL 1989

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COVER FEATURE

Enjoy playing the superb *Codename: Druid,* pages 81-87

Cover by Geoffrey Appleton

EDITORIAL

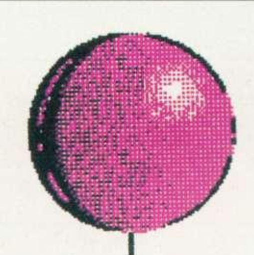
Last year, no-one in the business could deny that the Acorn world had a hard time. There was very little good news about.

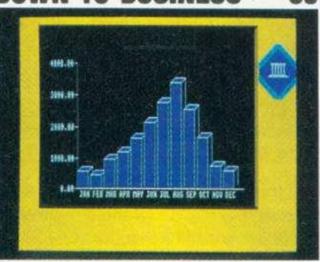
But recently, there seems more cheer to go around. Some dealers have commented that Arc sales are picking up well. Acorn's financial results, due out soon, will be much better than last year's three million loss. The R140 workstation arrived at the BETT show in January, and has been received well. And against the odds, Superior Software sold more games this Christmas than last – a bellwether for the home market. Other plus points include the growing number of mainstream games houses at least dipping a toe into the Arc market.

But the best news for us at *BBC Acorn User* is that there will be a *BBC Acorn User* show at Alexandra Palace in north London. We're already looking forward to seeing you there between July 21st and 23rd.

NEWS

FEATURES





REVIEWS



EDUCATION

REGULARS



NEXT MONTH

Ray tracing graphics on the Beeb and Arc, swapping data with a Psion organiser, plus the best of education for school and home. *ProArtisan* and budget printers will be reviewed



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Published by Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ. Tel: 01-490 1444. Telecom Gold 81: RED001. Micronet 919992492. Printed by Riverside Press, Gillingham. Typeset by Ician Communications Group, Harlow. Colour by Trumps Studio, Ware, Herts. Print production by Aquarius Print and Design, London. Distributed by BBC Magazines, 35 Marylebone High Street, London W1. ISSN 0263 7456

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The AP2 is the definitive Plus1 ROM. . . . .I'm not sure what i'd do without it. . . . like all of PRES's other products, it's been well worth waiting for" July '88

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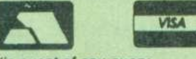
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NEWS

NEWS IN BRIEF

If you're stuck for summer holiday ideas and need to brush up your computer skills, a place on Bradford and Ilkley Community College's Creative Computer activity holiday could be the answer. Up to 12 students on the week-long July courses will be able to program BBC computer and get to grips with a range of software and peripherals. The organisers suggest that the course is particularly useful for teachers who use BBC Micros at school. There is also time to explore Bradford.

■ Panasonic has released a new 9-pin printer to add to its existing dot-matrix range. The KX-P1180 is Epson and IBM compatible. It also includes a paper-parking facility and fair-



Panasonic's 9-pin KX-P1180

ly fast printing. There are two draft and three near letter quality fonts – Courier, Prestige and Sans Serif. It is now available, priced around £250.

■ A new text processor for the Archimedes, *Premier* from Circle Software, includes a new feature the makers are calling 'dynamic text'. This allows names and addresses, figures and dates to be updated or changed without having to change the main file. The program also claims all the features of a full wordprocessor, including keyboard macros, as well as database and spreadsheet functions. Premier will initially cost £50 but this will rise as more features are added; a demonstration disc is also available for £5.

Show set for July

BBC Acorn User is launching a new series of exhibitions in July, in co-operation with Acorn and the BBC. The show is set to be the event of the year for Acorn and BBC micro owners.



The BBC Acorn User Exhibition – 'It'll be the show of the year'

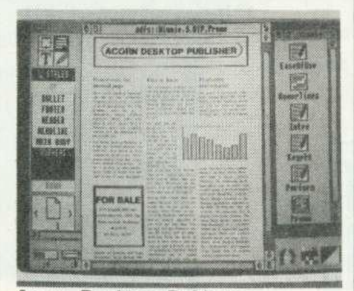
The three-day event will be run July 21st-23rd, at Alexandra Palace in North London – a venue famous as the site of the first BBC television transmissions.

The new show follows on from the *Acorn User* Exhibition, last held at the Barbican in 1987. Then, over 17,000 people turned up to see Acorn launch the Archimedes. The new show will be similar but bigger. As well as Acorn itself showing off the Archimedes, Risc OS, DTP and the latest Unix machines, there will be dealers and trade stands giving you the opportunity to buy the best in hardware and software. Plus there'll also be seminars and advice shops to help you get the best of your micro.

Pres' John Huddlestone said he was 'delighted to hear *BBC Acorn User* is reaffirming its commitment to exhibiting and supporting the Acorn market.' Chris Jordan of Hybrid Technology commented 'It's very good news, especially that Acorn is going to be there.' And Nova Fisher of Minerva agreed – 'It'll be the show of the year.'

New fonts for DTP

Acorn DTP, the Risc OS desktop publishing package written by *First Word Plus* author GST, will contain an upgrade to Risc OS when it comes out in May.



Acorn Desktop Publisher

It has a new Font Manager module on disc, which replaces the font system in the Risc OS ROMs. *DTP* will come with a very basic range of new-style outline fonts, just Times (Trinity), Courier (Corpus), Helvetica (Homerton), plus another face for headlines and symbols. Each should be in roman (normal) italic, bold, and bold italic styles.

Also bundled with the system will be extra printer drivers to supplement the dot-matrix and PostScript drivers that come with Risc OS. In particular, there are drivers for the Hewlett Packard Laserjet (much cheaper than PostScript laser printers) and Integrex colour ink-jet printers. There are also improved versions of the original DM and PS Risc OS drivers.

The whole system will cost about £150, will work on an Archimedes 310 or 440, and takes advantage of the multi-tasking and message passing of Risc OS.

Informix signs up for R140

Acorn has signed up a group of major Unix software suppliers to support the R140 workstation.

The applications lie in three areas – databases, 'fourth generation languages' and office automation. As well as the *Uniplex* office suite already announced, there's *Q-Office* from Quadratron. *Tetraplan* is an accountancy suite.

Informix is the Unix world's most-used relational database manager, and can be used to develop complete database systems. MPD's *Sculptor* and Thomson's *Sea-Change* also allow you to build your own applications more simply than in C or Cobol. This gives the R140 a solid base of top-flight software in the corporate and commercial market.

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On Micronet you can browse through an extensive software library of free programs, select one and then download it.

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INFORMATION

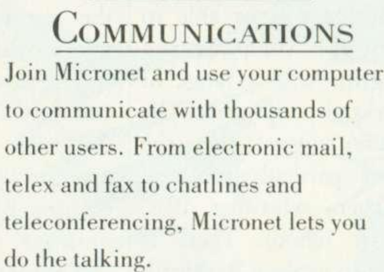
Micronet is also a computer magazine. Our computer news area is updated every day, so there's no better way to stay up-to-date, and our software reviews and features for all popular micros mean Micronet members are always better informed.

Add to this Prestel's massive database and you'll have all the facts at your fingertips.



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Micronet is not just informative, it's also a lot of fun! As a member you'll have access to a range of games, including the UK's most popular multi-user game, Shades, where the action is live and so are your opponents!



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And the good news is that at £9.95, not only is your first quarter's membership to Micronet now less than half price, but using Micronet starts at just 50p an hour – and that includes telephone charges! Wherever you are, Micronet is just a local phone call away.

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If you have access to a modem (1200/75 baud) and viewdata communications software you can see a free demonstration of Micronet. Just Dial 021-618 1111 and use the ID 4444444444 and password 4444.

You can look up a local telephone number once on-line.

Return to: Micronet, Telemap Group Ltd, Durrant House, 8 Herbal Hill, London EC1R 5EJ.

Name: ____________________

Address: ____________________

____

Tel. No.: ____________________

Age: ____________________

Machine Type: ____________________

AU/SP/4 89

MICRONET

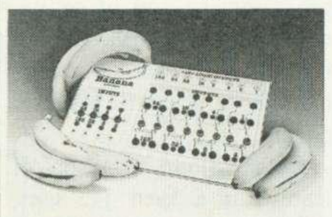
* Price includes 1st quarter residential subscription by direct debit only (normally £20) and does not include hardware or software. Minimum subscription period 1 year. Offer available only in the UK to new members. Free modem offer available to first time UK subscribers while stocks last.

Euclid on the move

Users of the Archimedes design package *Euclid* can now bring their designs to life with *Mogul*, an animation add-on for the program. Only a few frames in a sequence need to be drawn – the computer can calculate the rest – and characters created with *Euclid* can move against a background imported from an art package such as *Artisan*. Registered users can buy *Mogul* for £20, and a new Risc OS version of *Euclid* is also now available for £70, as well as a public domain 'film projector' to allow cartoons developed with *Mogul* to be distributed to non-*Euclid* users.

Going bananas

Castle Associates has updated its Banana Interface, a board for teaching control and modular technology and industrial computer applications as part of craft design and technology lessons. Designed with the help of CDT teachers the unit claims to be pupil proof and comes complete with cables to attach it to a BBC micro. The manual includes suggested projects and the package costs £201.25.



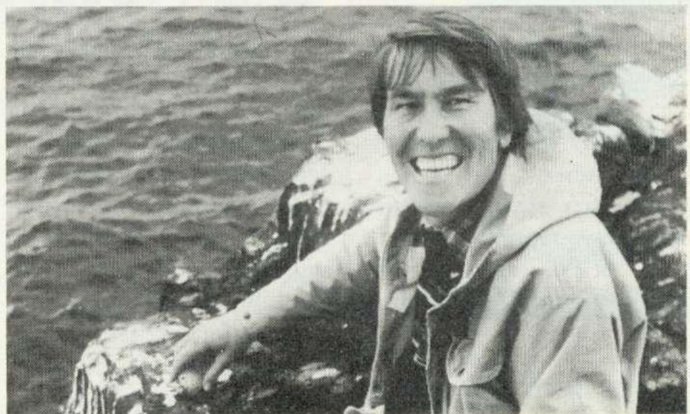
Banana interface for CDT classes

Opt for science

Two new resource packs from Chalksoft are aimed at GCSE Science students. *Optics A and C* costs £23 for the BBC B and Master, £25.30 for the Compact, and pupil workbooks are £3.95. An Archimedes version will be released in the summer.

BBC TV puts software on show

The BBC's new computing programme now has a name – *The Software Show* – and a host of celebrity presenters. It will be broadcast on Sunday April 2, and will be presented by Carol Vorderman, who used to do the sums on Channel 4's *Countdown*. And a special magazine, packed with programme information, will be issued free with the next issue of *BBC Acorn User*.



Tony Soper will test BBC Soft's *Birdspy* on The Software Show

Several specialists will be on hand to show how using computers makes their hobbies easier and more interesting. Wildlife expert Tony Soper will be using the BBC Soft program *Birdspy*, and radio personality Fred Housego will be testing the *Autoroute* program in a race to Sandy in Bedfordshire. Gordon Honeycombe will be looking to a computer to discover his family history. Viewers will be able to send off for *The Software Show* magazine, but readers of *BBC Acorn User* will find a copy attached to the next issue.

'We see the magazine as a very important part of the programme,' said John Allen, a member of *The Software Show* production team. 'There's going to be much information people will want to note down, so we need something they can refer to.'

The programme is likely to be repeated in half-hour segments on weekday evenings on BBC1 television.

Software on file

The range of educational software available for the BBC micro continues to increase and most programs released for the machine now fit into this category in some form or another.

Many programs are developed by small companies without large publicity budgets so it is often difficult to find exactly the right programs for a particular child or subject.

A new service set up by two teachers, Bright Sparks, aims to change all this.

The company has produced a range of catalogues listing and describing educational software suitable for particular age groups and machines. Two versions of the catalogues are produced, one is suitable for teachers and one for parents.

'We cover the range of BBC machines from Electron to Archimedes,' explained director Elizabeth Rose who set up the company along with Rosemarie Lawy. They use their classroom experience to select programs which they believe will work well in lessons; software suitable for parents is chosen for its general educational value.

As well as the catalogues, Bright Sparks will, when required, search its database for programs to meet specific requirements. 'We get a lot of enquiries about special needs programs and equipment,' said Rose. There is no charge for this service.

Arc, Art and Unix

Qudos has turned the Arc into a specialised graphics terminal running X-windows. X is the Unix graphics standard, and is supported by the Acorn R140. You need an Arc 440 and a network podule (like the one in the R140), plus Qudos' £340 X-windows network to connect your Arc to an Ethernet, including an R140 or other Unix machine and run X-windows based applications. Qudos' managing director Chris Stenton says the A440 stands up well against dedicated X terminals, 'The cheaper X terminals have only partial X-window capability, and are slower than the Arc.'

Acorn pushes into schools

Acorn has set up a schools service to publicise software releases for the Archimedes and BBC micro. The idea is to update teachers on new products by regularly posting them a brochure with details of the latest releases.

This free scheme will also include a technical helpline and use of SID, Acorn's Support Information Database bulletin board.

Software developers have greeted the scheme enthusiastically, although they have to pay for inclusion of their products. Dave Clare, of Clares Micro Supplies, said 'It's a good idea. The obvious advantage of it is that companies like us will be getting through to the right people in education.'

Primary and secondary schools nationwide have been sent enrolment forms, regardless of whether they own an Acorn machine or not. Ron Jones, education inspector for micro electronics in Lincolnshire, is glad of Acorn's help and expressed another advantage. 'We are inundated with requests for help so I think any close link with the manufacturer is a positive demonstration of commitment and support," he says.

Subscription forms have been sent to schools, but any which have slipped the net should contact Acorn's marketing department.



To celebrate the sale of 200,000 Masters, Acorn has donated one to the 'total environment room' of Westway special school in Burnley. Headteacher Stephen West (left) received the machine from Acorn's Harvey Coleman.

Valiantly roaming

A new product from Valiant Technology looks set to give children an early introduction to geometry and programming. The well-known robot manufacturer has designed Roamer, a free-standing, battery operated robot with a built-in keyboard. Various step movements and degree turns for the robot to carry out can simply be keyed in.

Interchangeable tops mean that the Roamer can be customised to tie in with project work. Roamer is available to schools for £86, but everyone else has to pay £109.

THE COMMS COLUMN

■ Eureka 2 is a new board for Archimedes users, running on David Joyce's *ArcPort* software, mentioned before in this column. Despite only just starting, this is a full-featured board, containing an amazing nine megabytes of downloadable Archimedes software. Included (for subscribers) is the entire range of Archimedes Shareware, distributed by Norwich Computer Services, several C programs from the Amiga recompiled in ANSI C to work on the Arc, and much more. This is native Archimedes software, not PC or BBC emulator material.

With all this downloadable software, it's good to know that the board is running on the ultra-reliable Miracom WS3000 modem, and therefore supports all speeds from 300 to 2400 baud, including 1200/75. An archiving/dearchiving program, similar to those used in the PC world is available, and this is needed to unpack the majority of files.

Also present on Eureka 2 are many articles about the Archimedes, and facilities for uploading your own programs to be distributed as shareware, the free distribution system where you leave your name and address for donations. Who knows, you might even earn something.

To encourage this, the board has been set up to accept reverse V23 (75/1200) operation, to allow V23-only modem users to upload material at 1200 baud. The speed selection is automatic, depending entirely on your logon speed. The board can also be used to send messages to Norwich Computer Services. The sysop of Eureka 2 is Archimedes expert Alan Glover, and the board runs 24 hours a day on 01-683 0629.

The original Eureka 1 board in Norwich, mentioned in this column in February, has moved location to Carl Wright's home, which should mean a more reliable service. The number is unchanging at (0603) 250689.

■ New on Telecom Gold this month is the Password database, an 'electronic trading floor' which contains a large database of electronic components which can be ordered from trade distributor Macro. The system gives price breaks for various quantities. More details from Password on (0800) 200700.

■ Featured bulletin board this month is ESoftC of Cambridge, a PC-orientated board which nevertheless contains much of interest to Acorn owners. Among the special interests groups on the board are sections for BBC micros, Archimedes, and a special section for Master 512 owners. This particular section features all the latest Master news including most of the information which used to be present on the Tubelink database on Prestel, including the 512 software compatibility charts, and lots of general information on the 512.

There are other sections of the board which are also relevant to 512 users, such as a forum for Turbo Pascal programmers, and of course, there is a large collection of downloadable PC software, much of which runs perfectly on the 512.

David Bloor, co-sysop of ESoftC is a keen 512 user, and himself participates in the 512 message section, where you can ask all those tricky questions about your 512. ESoftC runs 24 hours a day, using 300, 1200, 1200/75 and 2400 baud.

If you have any comms news for David Atherton, write to him here at BBC Acorn User, *or contact him on his mailboxes Telecom Gold 72:MAG11596 or Prestel 942876210.*

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UNIX SUPPORT SPECIALIST

Ideally a Computer Science graduate with at least 2 years in-depth Unix experience, including System V on Ethernet, with associated packages. A professional appearance and good interpersonal skills are essential as the role also entails attendance at exhibitions and dealer/distributor events. The successful candidate will liaise closely with Research & Development and Software Quality Assurance staff in order to maintain and expand his/her Unix knowledge.

Ref AU/JG/001

TEST DEVELOPMENT ENGINEER

To develop software and hardware facilities for the testing of new products and peripherals. Experience of BBC BASIC, Assembler and "C" is required, together with the ability to work under minimum supervision. Key tasks are the development of production test equipment, dealer test software, field diagnostic software and design reliability tests.

Ref AU/GB/002

SOFTWARE QUALITY ASSURANCE

Using the latest in state-of-the-art technology, you will be employing your sound programming skills, ideally gained with Unix, C, Pascal or Modula 2, to test and validate the software and firmware elements of all Acorn products. There is much liaison with internal resources and third party auditors and we seek applicants at engineer and senior engineer level who thrive in an environment working to high standards and tight deadlines.

Ref AU/AC/003

TECHNICAL AUTHOR

At least 3 years technical publications experience in the micro-computer or software industry is required for this role. You will be agreeing documentation requirements with Product Management and taking the specification through to the completed manual. En route, you will be liaising with R&D, graphic designers, typesetters and printers, ensuring that the final publication is delivered on time and to the required standard.

Ref AU/PG/004

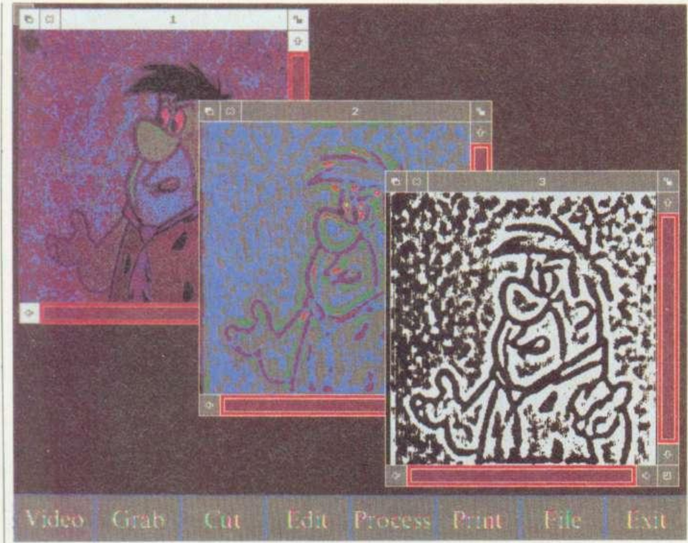
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Ref AU/RC/005

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To apply for any of these positions, please write with full career details to Mrs. Janet Henson-Webb our Senior Personnel Officer at: Acorn Computers Limited, Fulbourn Road, Cherry Hinton, Cambridge CB1 4JN. Telephone: 0223 245200.





False colour is a feature of York's workstation

Arc is taught a brighter image

The Archimedes could be in the front line of the fight against crime if current research work using the computer at the University of York is successful. Senior electronics lecturer Nigel Allinson has developed an image processing workstation based on the Archimedes and is teaching it to recognise familiar faces and objects.

The project uses two Archimedes 440s fitted with a video digitising expansion card developed at the university. 'Because the computer can process information so quickly there is no need for an external framestore,' says Allinson. He chose the Archimedes because the RISC chip was of innate interest; it was also cheap.

The video processing work is part of a project studying neutral networks, the way the human brain processes data. 'Computers see things differently to us and however quick they are at, say, multiplying two huge numbers, they're slow at making sense of the world around them when it is presented as visual information. Allinson's research aims to mimic neural activity using the computer.

Show doesn't go on

The *Micro User* shows will not take place this year. Would-be exhibitors ringing organisers Database to book stands at the shows, usually held in May and November, were told that there would now be no shows.

'We are not running an independent *Micro User* show this year,' confirmed Database spokesman Andrew Godsall. 'The show wasn't making any money and it would be uneconomic to continue.'

Visitors to the last show, at London's New Horticultural Hall last November, noticed that there were fewer stands. But for companies trying to establish themselves or their products, the lack of a show dedicated to BBC and Acorn machines at which to exhibit could mean problems reaching their customers.

CUSTOMER HOTLINE

■ Welcome to another Customer Hotline. In case you missed the first three, the aim of this column is to inform you of the latest happenings in customer support at Acorn. This includes new application notes you can obtain from us, what's on SID (Acorn's Support Information Database) and reminders on how you can obtain technical support from Acorn.

■ In about a month's time, that is early in April, Risc OS will start to be available from your local Acorn dealer for you to buy for your Archimedes micro.

To provide a good degree of support for this upgraded operating system, Acorn is setting up a Risc OS forum on SID. Within this forum, you will be able to share ideas, comments and problems with other users. Unfortunately, this service will be restricted to registered SID users only, but why not take advantage of our three month trial period and apply now?

■ The new Acorn retail price list is now out, and includes prices for the R140 Unix computer systems, stacking FileStore Econet fileservers, and site licences for Acorn software amongst other things. A copy can be obtained from Customer Support.

Other new product literature that is available from Customer Support includes leaflets for the R140 computer system, the release 2 compilers (Fortran 77, ANSI C & ISO Pascal), *Twin* (a text editor which is suitable for use with the compilers) and the *Software Developer's Toolbox*.

■ Two application notes this month, both about running old software on the Archimedes range. *6502 to ARM*, looks at the issues involved in porting software for Acorn's 6502-based microcomputers, the Electron, model B and Master series, on to the Archimedes range of micros. It covers matters such as legality of porting, evaluation of portability, transfer of software and resources available to assist the porting. *Archimedes 6502 Emulation* addresses the problems of running software under the various 6502 emulators, such as directly addressing the screen, emulating the Disc Filing System under the ADFS and using operating system routines. Both application notes are available from Customer Support, or again they can be downloaded from SID.

■ Just a reminder for those of you with release 1 compilers for the Archimedes.

Release 2 is now available and you can upgrade your existing compilers by sending the discs with a cheque for £30 per compiler to Acorn Direct, Studland Road, Kingsthorpe, Northampton, NN2 6NA.

This upgrade is required before you can use the symbolic debugger which comes as part of the *Software Developers Toolbox*.

■ Just a reminder about writing to Customer Support. To ensure the mail reaches us quicker, the proper address is Customer Support, Acorn Computers Limited, Fulbourn Road, Cherry Hinton, Cambridge CB1 4JN.

■ If you want to find out more about SID, try the guest system on (0223) 243642. You'll need viewdata terminal software set to 1200 baud receive, 75 baud transmit, 7 data bits and even parity.

■ *You can write to Phil Colmer and the Customer Support department at Acorn Computers, Fulbourn Road, Cherry Hinton, Cambridge CB1 4JN. If you've got a suitable modem, you can leave a message on SID.*

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0195G	310 Colour System	1213.25	1152.59
0257G	310M Entry System	1029.25	977.79
0258G	310M Mono System	1098.25	1043.34
0259G	310M Colour System	1282.25	1218.14

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0263G	440 Entry System	2908.35	2762.93
0265G	440 Colour System	3161.35	3003.28

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1080D	Ansi C	113.85	108.16
1081C	ISO Pascal	113.85	108.16
1082D	Fortran 77	113.85	108.16
1083B	Twin	33.35	31.68
1084D	Logistix	113.85	108.16
1086D	Prolog X	228.85	217.41
1087D	Lisp	228.85	217.41
0900B	PC Software Emulator	113.85	108.16

1st Word Plus

1st Word Plus is a mouse driven word processor which takes full advantage of the user-orientated desktop features of the Archimedes system. It is suitable for both absolute beginners in word processing and experienced users of other word processors.

Stock Code 1088D

Members Price £87.34 *Normal Price £91.94*

1088D	1st Word Plus	91.94	87.34
0902D	ARM Assembler Package	228.85	217.41

OTHER SOFTWARE

0903B	EMR Sound Synthesiser	49.95	47.45
0904B	EMR Creations Disc	19.95	18.95
0948C	EMR Studio 24	99.00	94.05
0905E	Logotron Logo	69.00	65.55
0906D	Pipedream	113.85	108.16
0917B	Pipedream Spellcheck	49.45	46.98
0908C	Flying Start II Database	99.95	94.95
0909B	Archeffect	24.99	23.74
0910B	ArcTFS	29.95	28.45
0911B	AutoSketch	91.54	86.96
0912B	ARC-PCB	99.95	94.95
0913B	ARC-PCB (with autorouting)	195.00	185.25
0914B	Lingenuity Presenter	29.84	28.35
0938C	ABC - Basic Compiler	99.95	94.95

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1242C	Programmers Ref. Man.	29.95	28.45
1211B	Arch. Assembly Lang.	14.95	14.20

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0937C	Pro-Artisan	169.95	161.45
1095C	Artisan	39.95	35.96
1099C	Artisan Support Disc	19.95	18.95
1096C	Graphic Writer	29.95	26.96
1097C	Archimedes Toolkit	39.95	35.96
1098C	Alpha Base	49.95	44.96
1094B	Sound & Graphics Demo	11.50	10.93
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0931C	Sigmasheet	69.95	66.45
0932C	Gammaplot	69.95	66.45
0920C	Deltabase	29.95	28.45
0921C	System Delta Plus	69.95	66.45
1233C	Sys. Delta Plus Ref. Man.	29.95	28.45
0922C	Order Processing*	64.95	61.70
0923C	Sales Ledger*	64.95	61.70
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0929C	Reporter*	24.95	23.70
0939C	Mailshot*	39.95	37.95

*** Requires System Delta Plus**

PRICES INCLUDE VAT

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0100C	Masterfile ADFS	22.00	16.50
0101D	Hearsay	69.00	51.75
0102B	Archimedes DFS Reader	10.42	9.90

OTHER HARDWARE

0805D	CC ROM Podule	56.35	53.53
0806B	Battery Backup for above	11.50	10.93
0803B	Armadillo Sound Sampler	126.50	120.18
0825C	IEEE488 Podule	326.50	310.17
0802C	Chromalock Podule	339.25	322.29
0808C	Watford Video Digitiser	286.35	272.03

Artisan

The Artisan graphics package for the Archimedes system runs in Mode 12 and makes full use of windows, icons and the mouse, as well as using standard files for all input and output. Standard screens and sprites are interchangeable with other programs using the Acorn conventions. Artisan uses the power of the Archimedes range to provide you with a program that is easy to use.

Stock Code 1095C

Members Price £35.96 *Normal Price £39.95*

ARCHIMEDES UPGRADES

0234B	Econet Board (as M128)	48.88	46.43
0266C	0.5Mb RAM (305 only)	171.35	162.78
0267G	Floppy Disc Drive	143.75	136.56
0268G	20Mb Hard Disc (300's) *	573.85	545.16

It is recommended that the Hard Disc is fitted by a dealer. This is a FREE service, please contact us for details.

0269C	Podule Backplane	44.85	42.61
0270D	ROM Podule *	67.85	64.46
0271D	I/O Podule *	97.75	92.86
0272D	MIDI add-on to I/O	44.85	42.61
0273D	MIDI Podule *	79.35	75.38

*** Requires Podule Backplane**

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0832B	Keyboard Extension Lead	8.37	7.95
0558B	SKART Lead	9.42	8.95
0425C	Archimedes Printer Lead	9.42	8.95
0795C	5.25" Disc Drive Buffer II	35.00	33.25
0796C	Serial Link Kit & Disc	18.16	17.25
0797B	Just Serial Link Cable	12.11	11.50
0826B	Arch. to Magic Modem	7.32	6.95
0827B	Arch. to Linnet Modem	7.32	6.95
0828B	Arch. Audio Lead	6.26	5.95

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0952B	Corruption	24.95	23.70
0950B	Quaser	11.95	11.35
1122B	Repton 3	19.95	18.95
0945B	Terramex	19.95	18.95
0946B	Pacmania	19.95	18.95
0934B	Orion	14.95	14.20
1179B	Zarch	19.95	18.95
1187B	Conquerer	24.95	23.70
0935B	Dread Dragon Droom (ed.)	18.95	18.00

ARCHIMEDES ACCESSORIES

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0789B	Blue Beebug Mouse Mat	3.68	3.50
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0716B	Archimedes Dust Cover	9.00	8.55

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Stock code 0946B

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Credit Cards





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NEWS IN BRIEF

■Mathematical theme pack *Curves* adds software resources to ITV schools programme *Videomaths*. The pack, a joint venture by Topologika Software and maths specialists Leapfrogs, also includes a book and video.

The software is suitable for the BBC B, Master and Compact and the pack costs £29.95 from Topologika.

■A directory of audio-visual alternatives to the dissection of animals in laboratory science experiments has been released by the Universities Federation for Animal Welfare. It includes slides, videos and films, and computer simulations which reduce the need for experiment on live animals. Readers who know of software which might fit into this category for a new edition of the catalogue should contact Olwen Terris, British Universities Film and Video Council, 55 Greek Street, London W1V 5LR. Copies of the catalogue are available at £3.

■Tedimen Software has released *Advanced Folio* which offers a whole range of extra facilities to its existing *Folio* foreign language wordprocessors. As well as 20 new fonts, there is a new letter-quality print size and a font designer which allows you to fonts or create new ones. *Advanced Folio* costs £28.75 but existing customers may upgrade for £15 by returning page 88 of their old manual which contains the serial number of the pack.

■Fernleaf has produced a tie-in with BBC Schools TV programme *ZigZag* which in April is to present a series on the Greeks. *Greek Dreams* (£19.95) has been designed to complement the series and offers eight programs – four ancient and four modern – which tackle mathematical, scientific and religious topics.

More DES money for data and research

by Nick Evans

Kenneth Baker has announced £410,000 for the National Educational Resources Information Service (NERIS), the on-line resources database for teachers. The money will be available over the next three years to ensure that NERIS covers the National Curriculum. Baker said: 'Teachers need the most modern aids to help teach the National Curriculum. Through this grant NERIS will be able to develop its database to meet these needs.' All the National Curriculum attainment targets, statements of attainment and programmes of study will be placed on the database and cross-referenced to information about materials available.

NERIS currently has 4000 users and 16,000 records of materials related to specific educational topics.



Computers in schools: are they value for money?

■The Education Secretary has also approved a three year research contract to assess the impact of IT on children's achievements. The research will be undertaken by the educational computing unit at King's College London led by Dr Margaret Cox, with some input from management Consultants Peat Marwick McLintock. The research will also look at the conditions under which IT is most effective and how far investment in IT represents value for money educationally; the project itself will cost £320,000 and involve case studies in up to 100 schools.

Software wins at BETT

Schools minister John Butcher announced £229,000 to boost teacher training in information technology in the introduction of the National Curriculum. The money will be allocated to train IT advisory teachers who will then train others.

'We want to see IT used not only in specific attainment targets for subjects such as maths, science and technology, but as widely as possible across the whole curriculum,' said Butcher as he opened the British Education and Training Technology Exhibition, held recently at the Barbican Centre in London.

There were many new programs and periphrals on display at the show which had its busiest year ever. Products as diverse as Acorn's R140 Unix workstation, the Valiant Roamer robot, and Integrex's ColourCel colour printer jostled for attention with new software releases.

4Mation introduced *Stretch* which builds on the success of *Snatch* which allowed the grabbing and printing of screens. *Stretch* is a utility for the BBC range of micros which prints banners and posters in up to sixteen fonts up to two metres in length.

Sherston Software demonstrated a range of new products including *Bookstore*, an educational database package.

Timetabling made easier

Minerva has announced *Timetabler* for the Arc. The software allows entry and verification of staff, pupil and room data and immediate updating to cope with emergencies such as destruction of rooms or staff resignations. The software will calculate the entire timetable, allocating rooms and staff appropriately.

Yorke House has released a new Master 128 version of its *T-Squared* series of timetabling and staff cover packages. The new version displays a wider range of data and the whole timetable is visible in spreadsheet format which may be scrolled in any direction.

Seeing stars

Another 9-pin printer from Star, but one with a difference. What makes the LC10C special is its ability to print in eight colours as well as a variety of Near Letter Quality fonts. Double and quad-sized lettering is useful for creating letter heads and titles. For a machine costing about £275 in the shops, the quality of output is surprisingly good and would be fine for most business letters or documents.



LC10C: can print in eight colours

With the added bonus of colour, the LC10C lends itself well to graphics applications.

The printer is entirely compatible with the Epson JX80 and therefore will work fine with the *Acorn User UserDump* ROM. Any other software that supports the Epson JX80 will work as well – and in text mode it's like the FX80, so your *View* printer drivers will still work. The printer is robust, although fairly light in construction. A parallel interface which enables the printer to be used without the usual 'spaghetti' getting caught up with the paper is provided as standard.

Paper can be friction-feed, sprocket-feed or single sheet. Using single-sheet paper is easy, with the paper-parking facility normally found only on more expensive printers.

The LC10C is a joy to use. It has virtually every facility I would want on a printer with colour and at such a reasonable price, it should be top of your shopping list.

Rob Miller

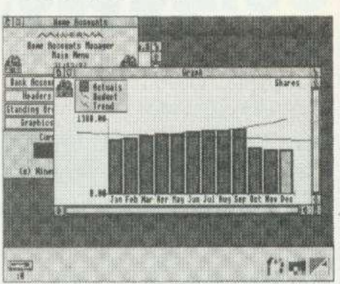
Accounting for home

BBC micro users have always had a number of programs to help them keep tabs on their money. Minerva has now released *Home Accounts* for the Arc. It makes full use of the Wimp environment, and if you can click a mouse button, it is easy to use. It's also one of the first programs written for Risc OS, and so takes advantage fo the new Desktop and multi-tasking.

Home Accounts certainly has everything you need for running your own personal finances properly, but it could easily be used to plan, control and monitor the finances of your club, local charity, or even a small business.

You can track any number of independent bank, building society, or credit card accounts. Once everything has been set up, you log all payments and receipts, so it can give you an instant, up-to-date record of all transactions.

Your bills can be divided



Organise your home finance

into as many categories as you like: mortgage, electricity, gas, phone, insurance, and rates (or poll tax) for a start. And standing orders can be set up.

I particularly like how 'warning indicators' can be set to alert you when your balance falls below a specific level, or when you exceed your credit limit on a credit card.

When it comes to comparing your actual bank statement with the program's balance, *Home Accounts* has a reconciliation procedure that makes it very easy to do. I particularly liked how you can highlight the transactions that have not been cleared. As you would expect, there's also a way of printing out summaries of almost anything.

And *Home Accounts* has one feature that I've never seen on a similar package – a graph module. This opens up an empty window, and you 'drag' the subject of the graph, say your deposit account, from the analysis window into the graphics window, then immediately a graph is drawn. If you are operating under Risc OS you could use *Paint* to grab the graph as a spirite for transfer to other programs.

There's only one strange ommission – password protection that could stop uninvited eyes seeing a complete record of your financial affairs. But if you want a program to keep track of your finances on an Arc then, for £49.95, I can't think of a better one than *Home Accounts*.

Dave Futcher

Megaprint-outs

There's yet another way to print poster-text on your Beeb or Master. ROM-based with an accompanying disc of utilities and fonts, it's called *Megaprint NLQ* from Sabre Software. It is a totally self contained package, with its own built-in text editor and a range of fonts.

Megaprint NLQ is ideal for producing normal document text in a variety of fonts, as well being very useful for producing notices, or posters in larger print.

As the Document Editor is in ROM, the whole of the

Font 6 - Bold Outline
Font 7 - Slanted
Font 8 - Action
Font 9 - Old English

Both new and old fonts available

computer's memory is available for text. Like *View*, *Megaprint* documents are made up of two types of data: instruction lines and text lines. The former relate to the font, the size of the characters, line length, margins, justification, spacing and so on, while the text lines each get printed.

Although quite capable, the Document Editor is certainly not a full-blown word-processor. It is adequate for basic text editing, you can copy or delete blocks, but there is nothing like search and replace. There is no 'wysiwyg' display or previewing either, as the editor operates entirely in mode 7.

Once you have created a document you have to save it to disc before printing. Although the print-out is of the highest quality, *Megaprint* rather makes a meal of it.

Megaprint's best 'proof' quality print-out is certainly top quality output. But an average A4 page will take about five minutes to print. In 'Draft' mode the printing is about four times faster, but there's a considerable drop in quality.

The package comes with 12 fonts ready to use. If you are not satisfied with what is on offer, the utilities disc contains a font editor for altering what is provided.

If you don't already have a package that will allow you to print out documents or notices in a range of text sizes and fonts, then *Megaprint NLQ*, at £30, is a good bit cheaper than other packages of this type – though it lacks previewing and a few frills.

Dave Futcher

Contacts

4Mation, Linden Lea, Rock Park, Barnstaple, Devon EX32 9AQ. Tel: (0271) 45566.

Ace Computing, 27 Victoria Road, Cambridge CB4 3BW. Tel: (0223) 322559.

Acorn Computers, Fulbourn Road, Cherry Hinton, Cambridge CB1 4GN. Tel: (0223) 245200.

Bradford Summer School, Bradford & Ilkley Community College, Great Horton Road, Bradford, West Yorkshire BD7 1AY. Tel: (0274) 546812.

Bright Sparks, 28 Kings Ave, Muswell Hill, London N10 1PB. Tel: 01-444 4818.

Castle Associates, Salter Road, Scarborough, North Yorkshire YO11 3UZ. Tel: (0723) 584250.

Circle Software, 33 Restrop View, Purton, Swindon, Wilts SN5 9DG. Tel: (0793) 770021.

Logotron, Dales Brewery, Gwydir St, Cambridge CB1 2LG. Tel: (0223) 323656.

Minerva Systems, 69 Sidwell St, Exeter, Devon EX4 6PH. Tel: (0392) 437756.

Panasonic Industrial UK, 280-290 Bath Road, Slough, Berks, Sl1 6JQ. Tel: (0753) 73181.

Sherston Software, Swan Barton, Sherston, Malmesbury, Wilts SN16 0LH. Tel: (0666) 840433.

Valiant Technology, Gulf House, 370 Old York Road, Wandsworth, London SW18 1SP. Tel; 01-874 8747.

In next month's issue

Next month in *BBC Acorn User*, the theme is ray tracing for your Beeb and Arc. Richard Browning shows you how the idea works, and introduces a program to help you draw intricate 'shiny ball on tartan' pictures.

There's a major education feature too; Chris Drage and Nick Evans pick the best of the huge range of educational programs – software that you can use in the home as well as at school.

Joe Telford describes a routine to display the results of questionnaires and surveys, and help you draw pie charts and graphs to illustrate your findings. If you have a Psion Organiser, then there's a program to allow you to swap data between that and your BBC micro. You can then edit all your Psion notes using the better keyboard, and back up your RAM packs on disc.

And there's all the regulars too: David Atherton's Hints and Tips, Arc Agora from David Acton and the best news of the Acorn world. We review *ProArtisan* on the Archimedes, and Shibumi's *Problem Solver* on the Master 512. And there's also a selection of budget printers to choose from.

Plus there's *BBC Acorn User*'s annual reader survey, your yearly chance to say what you think about the magazine and also what you think should be in your favourite micro magazine.

Diary dates

2 April. The Software Show BBC1, 10.00am.

11-14 April. CAL '89 Exhibition, University of Surrey, Guildford. Contact Terry Hinton, (0483) 571281.

21-23 July. BBC Acorn User show. For details contact SafeSell, (0737) 814060.

New address

Micro-Aid has moved office to: 1 Kildonan Courtyard, Barrhill, South Ayshire, KA26 0PS, Scotland.

Overseas readers should note a change of address for the Dutch Acorn user group, the Big Ben Club, to: PO Box 1189, 6801 BD Arnhem.

BLUNDERBOX

Our apologies to Innocent Software for a wrong price in last month's news. Its compilation of BBC Soft's existing Arc programs, *Ecology and Conservation, Relationships* and *Food and Population*, are available on one disc for £29.95, and not £29.95 each. Contact Innocent Software at: Benowyn, Park Farm Rd, West Wycombe, Bucks HP12 4AF.

The Amstrad SM2400 modem will in fact auto-answer an incoming V23 (Viewdata call) correctly – contrary to our review in March. Reader Andy Glover pointed out that his Eureka 2 bulletin board (see Comms Column) and the Arcport BBS (0252-737065) work this way.

Special needs

David Colven, *ACE Centre,* Ormerod School, Wayneflete Rd, Headington, Oxford OX3 8DD, tel: (0865) 63508, assists those with learning difficulties. Richard Poutney, *MESU,* Sir William Lyons Rd, Science Park, University of Warwick, Coventry CV4 7AZ, tel: (0203) 416994, runs a support information base for teachers.

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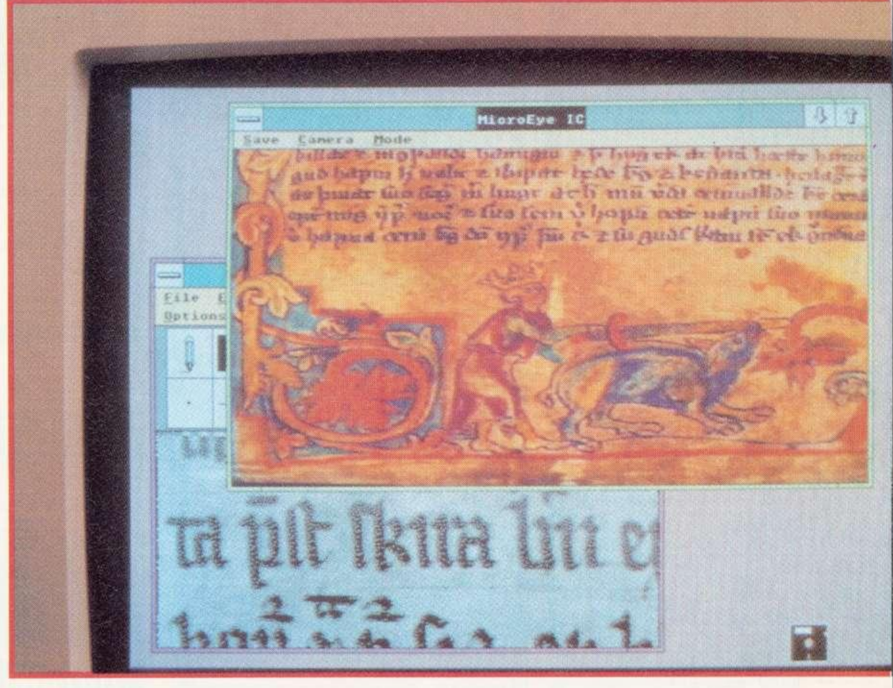
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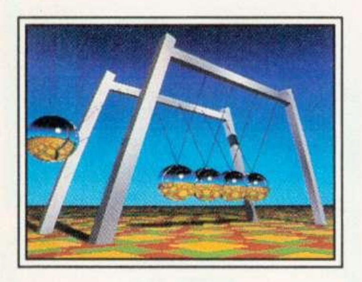
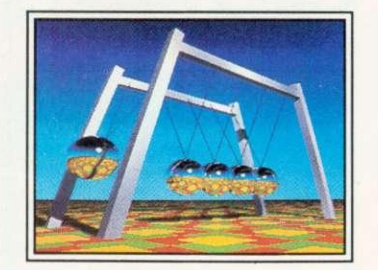


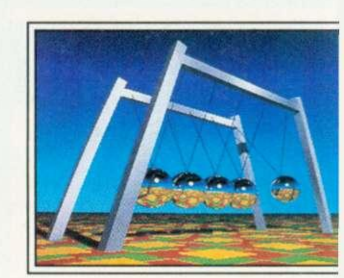
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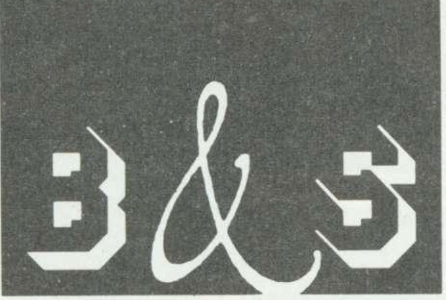


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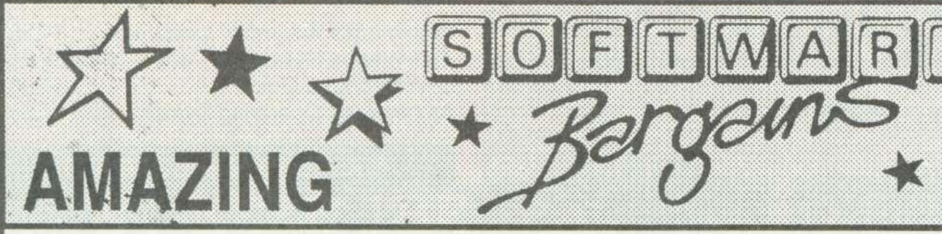
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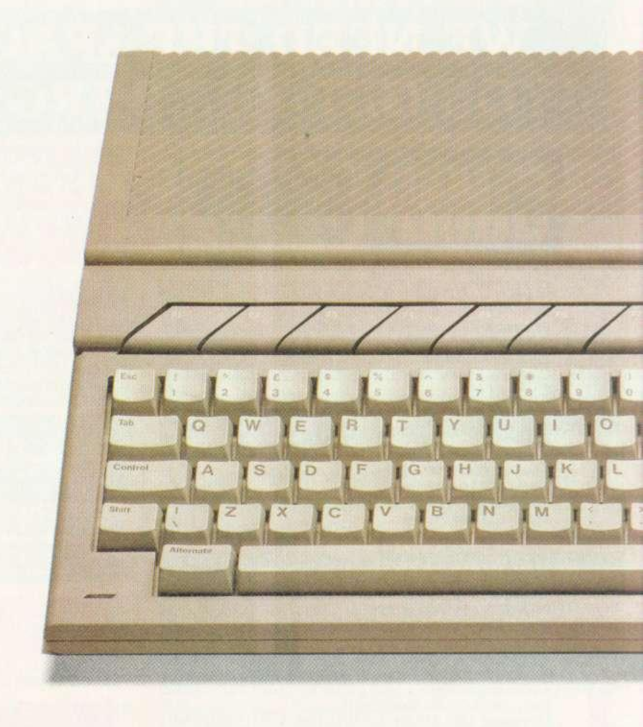
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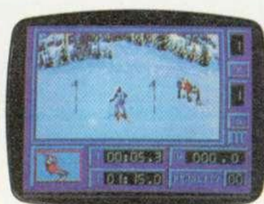
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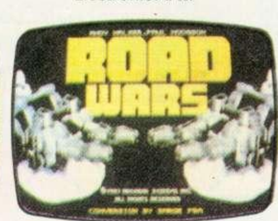


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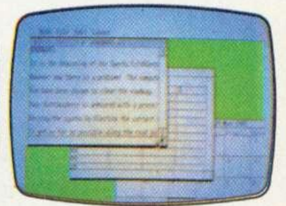
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S·C·A·N LIGHT

The scanner, interface & software for the Archimedes

The Hardware

Scan-Light is based around the scanner interface used for FAX-PACK and provides a low cost way to input high quality scanned or 'digitised' text and pictures into the Archimedes.

Scan-Light consists of a half-width expansion board (that will fit into any Archimedes), on board ROM software and an 8.5 inch 200 dpi scanner.

The hand-held scanner will scan pictures or text from loose pages, photographs and books, and because of its full A4 width it will scan complete A4 pages of text or pictures up to 8.5 by 11.5 inches in size. As such, it is far more flexible and useful than other 'half- width' scanners. The scanner also has a brightness control to cater for a range of document contrasts.

Scanning a picture is simple; the scanner is placed at the top of the picture, a menu option is chosen and the scanner is just rolled over the page. The scanner interface ensures the picture is scanned accurately at 200 dots per inch, irrespective of the scan speed.

Completely compatible with Arthur and the new RISCOS operating systems. It can, for example, run on the RISCOS desktop, where it can create files for direct use in the RISCOS paint or draw programs. These programs would allow the pictures to be edited or altered in an infinite number of ways.

28 days 'no quibble' money back guarantee, in addition to the normal 1 year parts/labour guarantee and free software update service.

The Software

All the necessary scanner controlling software is included on a ROM as part of the scanner interface — it does not require a disc.

The software is WIMP based which makes it very easy to use, with all features being controlled by menu options. These features include:

- The currently scanned page is viewed within a window, which can be scrolled and re-sized like all windows.
- It is possible to 'zoom in' or 'zoom out' so the scanned image may be viewed at any size or scale from 1% to 999%.
- Pixel editing facilities allow individual 200 dpi pixels to be drawn or 'undrawn'.
- Printer drivers are included to print the image to a variety of dot-matrix, inkjet and laser printers.
- The scan can be either a monochrome scan (best for text) or a 'half-tone' scan (best for pictures).
- The image may be viewed either as a monochrome, or 16 grey level picture.
- The whole image, or any selected part, may be saved in a variety of ways:
    i) As a compressed data file (saves disc space).
    ii) As a monochrome black and white sprite.
    iii) As a 16 grey-level sprite.

The latter option is ideal for photographs or pictures and is designed to allow very high quality pictures to be included in, for example, paint programs, word processors or DTP programs.

Scan-Light is equally suited to capturing photographs from magazines, diagrams or printed text from books, or hand written notes or signatures. An entire A4 page can be scanned into the computer and then filed away on disc to be recalled later (so it can be viewed, subsequently edited or re-printed) and so could form the basis of an electronic document archiving system. It could also be used to build libraries of pictures or diagrams for future reference.

Scan-Light, in conjunction with the outstanding graphics facilities available on the Archimedes, finally takes computers away from their text only backgrounds, into a world where they can handle text and pictures with equal ease.

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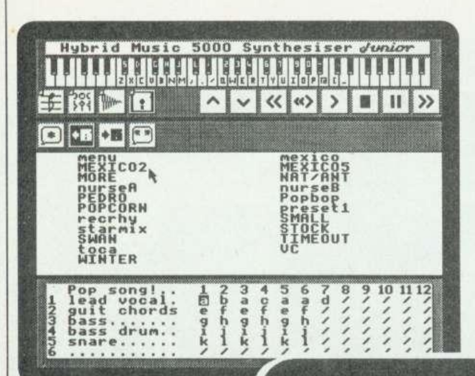
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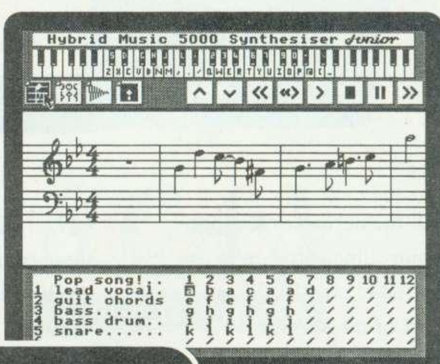
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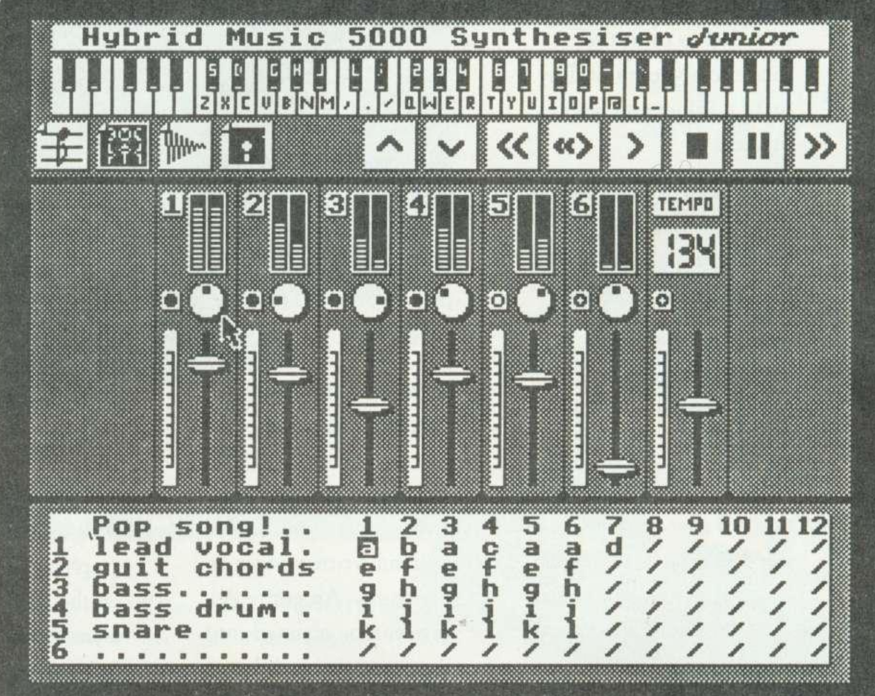
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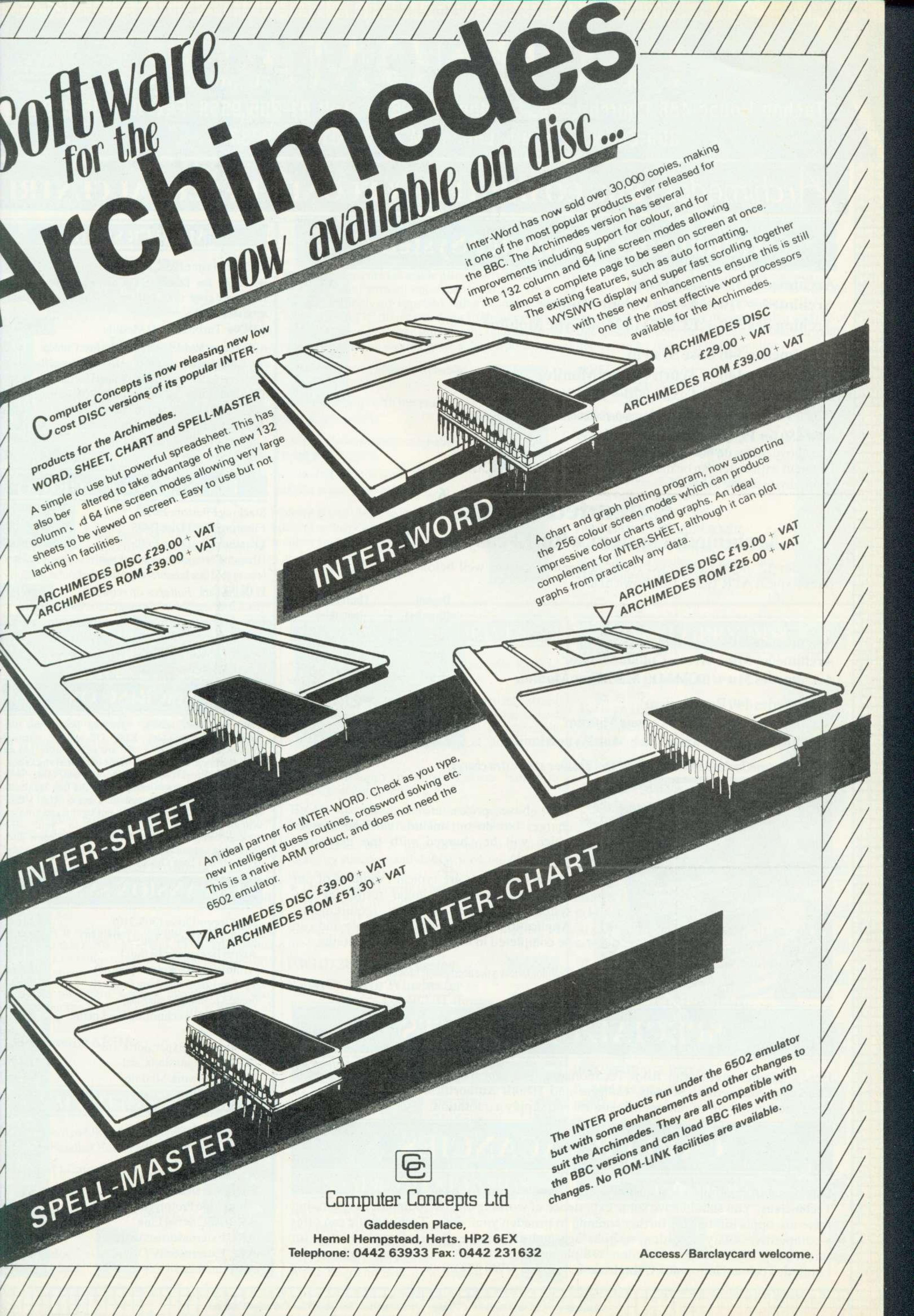
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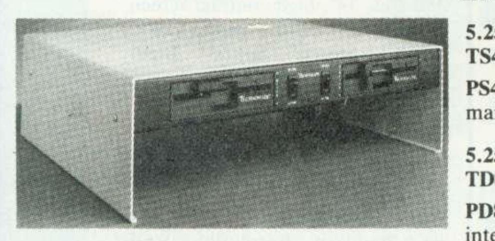
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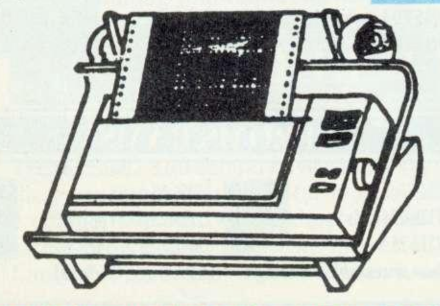
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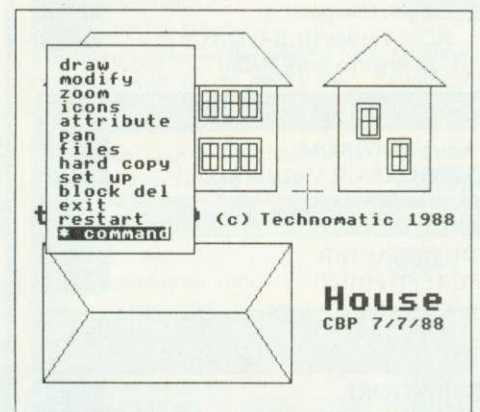
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HINTS & TIPS

SWITCH EASY

Storing and restoring data in sideways RAM, some advice for faulty discs and nifty printing on your Electron are just some of our suggestions

David Atherton

A W Cumming of Chester-le-Street found Brian Ross's 'Cheaper Keeper' article in the January 1989 issue of Hints and Tips very interesting, but points out that Master owners would probably prefer to archive their data in sideways RAM, just like the real *OverView* keeper. For those of you who didn't see the original, the *OverView* 'keeper' is a way by which you can suspend one application, and enter another.

Afterwards, the second application can be left, and you can return to the first one just where you left off. Brian Ross supplied *Exec files which saved a complete application to disc and started another, and then restored the original with another disc file. While it is effective, this was much slower than using sideways RAM.

Mr Cumming provides two programs – one to store data away, and another to restore it. Type in and save the two programs in the yellow pages, and then run them.

Two machine code files, Keep and Restore, are created by the programs – so save the typed-in files as something completely different. In use, they are quite straightforward. Start working in an application, say *View*, and if you wish to leave and run a Basic program, type *Keep – the keeper program will run from disc – and then type *Basic, followed by Chain in the normal way.

When you have finished using Basic, type *Word again to reselect *View*, and then type *Restore. Your *View* text, printer driver, and other settings will then be restored, and you can just continue where you left off. The Keep and Restore programs must be in your current directory or library so that they can be run from disc.

The program as provided needs two adjacent banks of sideways RAM, which are addressed in the same way as the Master 128, that is, by using &FE30 as both read and write select register. This means that it will work with any Master series micro, a 128k model B+, and the Solidisk TwoMeg 128 board, or even two banks of *Acorn User UserRam* on the model B (and possibly some others).

The type-in listing as provided uses RAM banks 4 and 5, but can be modified as appropriate by altering the variable 'ram1' at the start of the listing, to the lower of the two RAM banks being used.

But what can you do if you don't have sideways RAM? Mr Cumming even caters for non-sideways RAM owners by determining whether a filename has been added to the command which does the keeping and restoring.

If you type *Keep Fred, then three files 'fred1' 'fred2' and 'fred3' will be created by the program on the currently selected disc. You can do this without any sideways RAM, and it has the advantage that everything can be restored after the machine has been switched off – so it's useful even if you do have the needed RAM. To restart, you would type *Restore Fred.

Note that because of the numbers added, the maximum filename length allowed is one less than normal – six for DFS discs, nine for ADFS.

You could even keep a number of archived applications, such as a couple of half-completed wordprocessor documents or spread-sheets. The only requirements are that when you restore, you are in the correct 'language' (*View*, Basic, etc) and screen mode, and that you can reach a point in the program where you can type a star command.

The utility was written and thoroughly tested with the ROM members of the *View* family. But it should work with most 'language' ROMs – make sure you try it out before you start relying on it, though. The programs work by copying out &00-&8F of zero page, &400-&800 and from OSHWM to &8000 to sideways RAM, or three separate disc files (OSHWM is the same as Basic's PAGE). These three areas of memory are allocated to the current language, and so by restoring them afterwards, the language ought to be returned to its former state.

Either the data is copied to sideways RAM (using the pseudo-addressing system through Osword 66) or to three files with suffixes '1' '2' and '3' if a filename is given. The program itself, and its workspace are located at &900 in memory, and should only corrupt page &9 and page &A.

However, if a very long filename (for example a deep ADFS path) is used, then the beginning of page &B is corrupted too which, on the model B and B+, would completely destroy any function key strings.

£5

FAST PRINTING ON ELECTRON

Hugh Dobbs of Waterford, Ireland, was interested in Brian Ross's fast printing routine for the Electron. And he's sent in a new version which improves on the original in several ways.

It is shorter for a start, and it doesn't wait for the busy flag to go high if the flag is high already, making the routine

```
  BMI busy
  PHA
  TXA
  LDX #0
  BNE loop1
  BNE loop2
  TAX
  PLA
  BMI busy
  STA &FC71
  RTS
```

Even faster printing on the Electron

run faster still when the buffer is full, and it only uses the X register, meaning that the Y register, which would often be used to control a character output loop in a machine code program is not disturbed. Also, Hugh's routine has been written so that no local storage is used, and so the routine could be placed in ROM. But it does corrupt the X register, whereas Brian's program used local storage to archive X and Y. The code shown on the previous page replaces relevant parts of the original.

£5
NLQ FONT REPROGRAMMING

Robin Barnes of Westcliff-on-Sea has a Kaga Taxan KP810 printer, which allows not only reprogramming of the standard font (as all FX-80 compatibles do) but also reprogramming of the NLQ font. Robin has been trying this out, and has reported the fruits of his research.

The printer manual documents some codes for reprogramming the NLQ character set, but these don't seem to work. What the manual doesn't say is that the codes only work if an extra 6264 RAM chip has been inserted. Some printers already have the extra chip fitted, but if not, it only costs a few pounds from dealers such as Watford or Technomatic.

To fit the chip, the printer must be taken apart. The ribbon and dust cover should be removed along with all the cables. Two small screws at the back of the printer and two plastic clips under the front secure the top. When this is removed, the main circuit board is exposed. Towards the back and on the left hand side are a set of four 28-pin sockets. If only three of these are occupied, and the empty one is the third from the left, then the RAM is absent, and the 6264 chip should be placed in this socket, with the notch pointing towards the back of the case. Anyone who has fitted ROMs to their BBC micro will find this straightforward. The printer can then be reassembled and powered up.

VDU 27,37,1,0 – selects the RAM character set

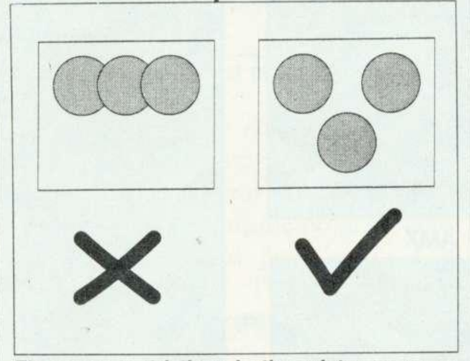
VDU 27,58,0,n,m – copies the ROM characters between n and m into RAM

VDU 27,38,0,n,m – redefines the RAM character set. The characters are redefined from character n to character m.

Codes for programming the printer

The codes for programming the printer are shown in the box. The format for redefining characters is as follows. Each NLQ character is defined onto a grid 12 pixels across by 16 deep. The first two bytes sent for each character are the proportional data bytes. These define the start and end position for a character, and whether it has a descender (such as j,y,g,p and q). The first byte contains the start position for the character and can take a value of between 0 and 14. If the character has a descender, then the top bit of this byte should be set – the byte should have 128 added to it. The second byte contains the end position, and can take a value which is at least nine greater than the start position, but less than 24.

You will notice that the data seems to be working to a 24-pixel grid. This is because the printer can print on the half-way points across the grid. The reasons we don't just say it's working on a 23x16 grid is because this would be confusing in terms of matching widths to say, non-NLQ characters or graphics printing. And there is a restriction: for a horizontal line, the printer can't print adjacent dots 'half a pixel' apart – they must be full pixels. The diagram shows this clearly.



There are restrictions in the printer program

The reason for defining a start point is to avoid padding the definition with unnecessary zeros. After the two start bytes, 23 pairs of data are required to define the actual character. The grid is 16 'pixels' high, and each pair defines a vertical column starting at the left. The top eight pixels are defined with the first byte, with bit 7 referring the top left-hand pixel on the grid. The bottom eight pixels of the first column are defined by the next byte, in the same way, with bit 0 referring to the bottom left hand pixel. This carries on for the remaining 23 vertical positions (12 grid columns, and 11 spaces in-between).



Kaga Taxan KP810: allows downloaded NLQ

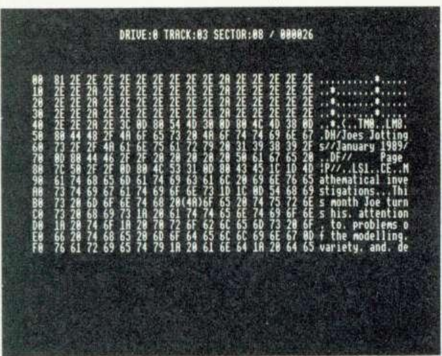
You can, if you wish, regard the grid as a full 23-columns wide, because although an in-between pixel cannot be printed if the column on either side of it contains a pixel at that point, defining such a pixel will cause no ill-effects – the printer will simply ignore it.

Note that although an end position is specified, it is in fact not needed, and you must always send 46 data bytes, padded with zeros if necessary. The full sequence, then, for sending the definition for, say, characters A to B upper case is this. First send VDU 27,38,0,65,66 to redefine the codes for Ascii codes 65 to 66 (A to B). Now for A, send VDU 2,18 to start at half-column 2, and finished at half-column 18. Then you send 32 bytes of data, building up the 16-column character from the left, and then 14 zeros to pad out to a total of 46 bytes. That completes character A. Then VDU 1,19 means start at half-column 1, and finish at half-column 19. This should be followed by 36 bytes of data, building up the 18-column B from the left, and 12 zeros to pad to 46 bytes. This is known to work on the KP810, but the redefinition of NLQ data is not unique to this printer.

£5
DISC FIXING

A useful tip has arrived from Michael Wollenberg of Botley concerning faulty DFS discs. Often when you are trying to load a file, the dreaded 'disc fault 18' will appear, and it is impossible to get at the file. Use of a disc sector editor such as ADT or the one supplied as standard with the Watford or Solidisk DFS, will often show that only one sector on the

disc is actually corrupted. If the file being recovered is a text file, then if you could jump round the bad sector, you could get the rest of the data back. A sector contains 256 bytes, so you would only lose about 50 words of your file. If this occurs, try loading the bad sector using your disc sector editor. The bad sector is easily seen, as this is reported with the disc fault in the format tt/ss.



Disc sector editors can repair disc faults

When you attempt to load the sector, the disc will probably whirr and clank, but eventually the bad sector should load in (the fault may also be reported again). If you're lucky, there may even be part of the data present, but if the sector is badly damaged, you might just get a sector full of &FF bytes. You can try to load the sector several times (move to the previous sector and back again) to see if you get a better portion of data.

To cure the bad sector, albeit with the wrong data, simply resave the sector to disc. The reason that DFS reports a sector as 'bad' is not because of the data on the sector, but because the cyclic redundancy check (CRC) or identity (ID) bytes do not correspond with the sector contents and position. Writing the sector back to disc updates these values and often the sector need no longer be regarded as 'bad'. Obviously, the new data may not be what was intended.

The net result is that if say, the file is a *Wordwise* or *View* file, then you will be able to reload it into the wordprocessor – the Load command will no longer report an error. What you will find is that the text is corrupted at some point, and you will have to make amendments before you resave the file. A useful tip is to set your wordprocessor to 'overwrite' mode, as the number of corrupted characters will match exactly the number of correct characters missing. If you have a good memory, you should easily be able to retype the missing words.

£5

ON ERROR CONTROL

```
   10 REM Error Demo
   20 REM by G L Gunstone
   30 REM for B/B+/E/M/C
   40 REM (c) Acorn User
Apr 88
   50 :
   60 MODE 3
   70 PRINT "Error Demo"
   80 ON ERROR PROCerror
   90 ON ERROR PROCerror:
ON E% GOTO 120,140,150,1
60,170
  100 PRINT "First, press
 ESCAPE"
  110 REPEAT UNTIL GET=32
  120 *FX124
  130 PRINT 300/0
  140 PRINT "Wot, no quot
e marks
  150 x=300*(10-1
  160 P "Wot, no full sto
p"
  170 PRINT"Finished"
  180 END
  190 :
  200 DEFPROCerror
  210 VDU 7
  220 PRINT "Error Number
 ";ERR;" at line ";ERL
  230 IF ERR=17 E%=1
  240 IF ERR=18 E%=2
  250 IF ERR=9  E%=3
  260 IF ERR=27 E%=4
  270 IF ERR=4  E%=5
  280 PRINT"Press SPACE f
or next error"
  290 REPEAT UNTIL GET=32
  300 ENDPROC
```

The ON GOTO construct pin points errors

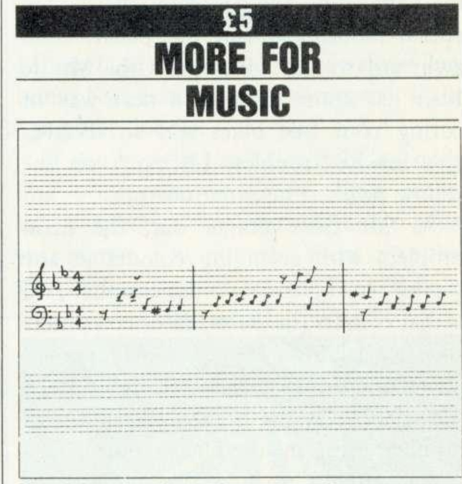
Mr G L Gunstone of Wimborne read this column last May, where it said that the problem with error-trapping in Basic is that after the error, the program must return to one fixed point – the ON ERROR statement. This is because a side-effect of the error is to forget any Basic stack information, whether you are in the middle of a FOR-NEXT or REPEAT-UNTIL loop, or within a function or procedure. This makes returning to the same point in the program (thus ignoring the error) impossible. This is why there is no CONT instruction in BBC Basic. CONT is present in most other Basics, and allows you to continue the program from the point where an error occured.

But, Mr Gunstone points out that it is perfectly possible to jump to difficult points in a program, by interpreting the error when it occurs and jumping to the appropriate point. This is done with the ON..GOTO construct, and is demonstrated by the short program which is supplied in the box.

Note that the lines 120 to 160 have deliberate errors in them to demonstrate the point. Don't correct these errors when typing the listing in. The important point is that the various error numbers are converted in the procedure to a straight 1-5 sequence to allow ON-GOTO constructs to work. It remains that you can't jump into any kind of loop, function or procedure. The GOTO destinations must be within the simplest main program section.

£5

MORE FOR MUSIC


A quick way of printing pairs of staves

There's been quite a bit of response to Terry Blunt's music manuscript printing program published in this column last June. Mostly it's been along the lines of adding pairs of staves for treble and bass clefs, or larger groupings for orchestral scores. After all, it's much cheaper than buying real manuscript paper. Frank Chaplin of Chorley has sent the quickest solution to printing pairs. Just add the following lines:

```
   50 G%=8
  192 FOR topspace%=1 TO
4
  194 VDU 1,10
  196 NEXT topspace%
  382 IF G%=8 G%=2 ELSE G
%=8
  390 FOR blank%=1 TO G%
```

Lines 50 and 390 replace the old lines with those numbers.

All submissions – hints, tips, programs or simply ideas – should be sent to Hints and Tips, BBC Acorn User, *Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ.*

ARC AGORA

PALETTE PERFECT

A cure for colour arrangements, a program for file comparisons and a one-line doodle

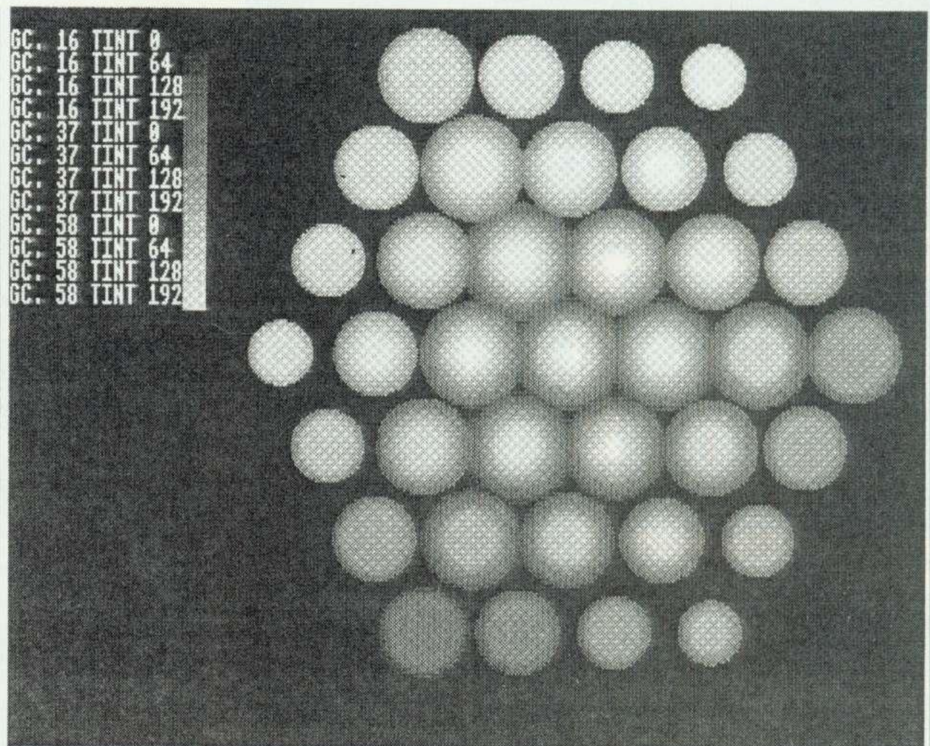
David Acton

The first of this month's cracking pair of listings comes from J de Boer of Holland. Regular readers will have heard me bemoaning the problems of the 256 colour modes and why this palette is so awkward to get to grips with. Mr de Boer has come up with a neat way of curing your hue blues and so receives £15 for his troubles. Listing 1 on the yellow pages is his solution.

As Mr Boer points out, the main problem with arranging colours in any sort of rectangular, two-dimensional grid is that colours (in the realm of computers and television at least) are made up of only three primary elements – red, green and blue. Listing 1 gets around this problem using the established notion of a 'colour cube'.

Imagine that one corner of a cube is black and the opposite one is white. Now imagine the cube to be standing on its black corner and yourself looking down upon the white corner. Three of the other corners are used to represent red, green and blue – the three primary colours. The remaining three corners correspond to the secondary colours: yellow (red + green), magenta (red + blue) and cyan (blue + green). The sides of the cube are then coloured accordingly. So for example, the edge connecting the blue and magenta corners is coloured according to a blue-to-magenta scale.

Listing 1 shows such a cube as viewed from above the white corner. The cube consists of many discs – each one made up of a set of concentric colour bands ranging from dark on the outside to bright in the centre. In fact, all 256 colours are shown on the screen. Each colour is placed in a disc according to its red, green or blue content; the particular band it occupies is determined by the colour's brightness. Unsaturated colours congregate towards the middle of the picture; pure colours are grouped around the other vertices.



Arranging colours in a two-dimensional grid is made easier by using a colour cube

Once you've entered listing 1, run the program and move the pointer on to a disc of your choice. Press the left-hand mouse button. A scale will be displayed on the left-hand side of the screen. Each colour of the disc is shown, together with the GCOL x TINT y command you would require if you wanted to choose that colour in your own program.

Move the pointer onto the scale. As it passes over a colour the red, green and blue elements of that colour are shown pictorially in the bottom left-hand side of the screen.

Above this is shown a COLOUR statement. The last three parameters of this represent the red, green and blue elements of the colour and you would use these figures if you wish to select this colour in a 16-colour mode for example. The first parameter indicates which palette register needs to be changed to affect the colour. This needs a little further explanation.

You may recall from previous Agora pieces that the 256-colour modes are unusual (to put it politely) in that four bits of each colour are displayed via the palette registers (as used for all other modes from 2 to 16 colours) and the other four bits are sent directly to the display hardware.

The upshot of this is that whereas in mode 12 (for example) you may set each colour to the exact hue required, in 256-colour modes you can only change the palette in blocks of 16 colours. So the first parameter, shown in the COLOUR statement by listing 1, may be used in a COLOUR x,r,g,b command to alter the

specific hue but another 15 hues will be changed as well.

The working of the program can be divided into three sections. First, the 256 colours are examined to find their red, green and blue content. The 'sum' of the elements of each colour is recorded in the array sum%().

Secondly, the array is sorted using PROCsort – using the standard 'quicksort' algorithm. Joe Telford and Nick Weatherby discussed sorting routines in the October and November 1987 *Acorn Users*. Finally, the colours are 'unpacked' from the array – plotting the darkest circles first and building up the discs band-by-band.

Mr Boer points out that enhancing his program to allow the interactive changing of the 256-colour mode palette doubles the length of the code and, in his opinion, makes a mess of the colours and thus 'isn't too handy'. I can only agree.

£15 BEYOND COMPARE

Our other offering this month is a handy file-comparison program from Emmet Spier. This is one of the programs I've always been meaning to write but never seemed to get around to doing. Thanks for saving me the trouble Emmet – £15 is on its way.

Listing 2 is the source for the machine-code utility which is saved (if assembled correctly) in the current library as 'Compare'. Once you have successfully run listing 2 and have a copy of 'Compare' in your library then, to compare the two files 'Fred' and 'Jim' say, simply type a command like this:

*COMPARE Fred Jim

The lengths of the two files are first displayed for an instant check. Then, the contents of the files are compared with each other – byte by byte – and the number of differences displayed at the end of the process. The real importance of this utility comes when trying to identify backup copies of programs or other files. *Compare is the safe and easy way to spot redundant or old copies of valued files.

Like all utilities of its type, *Compare runs in 'transient' memory – a lump of the RMA (Relocatable Module Area) which is borrowed for the purpose. The operation of the program is relatively simple and, as Emmet points out, owes nothing to the Programmers' Reference Manuals – it was written only with reference to the good old Advanced User Guide. You could easily do the same thing on a Beeb.

The name of the first file is found by skipping any leading spaces in the command. If no name is given, a syntax message is shown. Otherwise OS_Find is called to open the file and the handle is returned. If the file does not exist, a file handle of 0 is produced by OS_Find and a No such file error is displayed by *Compare. The same is done for the second file.

Another call, OS_File, is used to obtain the lengths of the two files in bytes. These are shown in decimal by using the OS_BinaryToDecimal call – you have to do this 'by hand' on the Beeb. The comparison now takes place. The ARM's register 12 is used to contain the number of discrepancies between the files.

Finally, the contents of R12 are printed out using OS_BinaryToDecimal again, and the files are closed.

Note that the 'X' forms of the SWI calls are used throughout the code. Prefixing an SWI name with X prevents the call from generating errors.

Instead, only the 'V' (overflow) bit of the status register is set to indicate that something nasty has happened. The X form is often very useful for detecting faults before they actually occur (for example, for realising that a filename is invalid before a program stops abruptly with a 'Bad name' error).

In transient utilities such as *Compare, the X form is recommended for all SWI calls. This is because the nature of transient programs means that errors are not always handled as well as one might hope.

Listing 2 makes use of assembler 'macros'. BBC programmers may be familiar with the 'OPT FN' approach for including bits of data and code into the middle of a piece of assembly language. On the Arc, you can even drop the 'OPT'. Emmet has defined a macro 'FNprintdec' to assemble a piece of code which takes the value in register R0, then converts it into a string and finally displays it.

Another feature of listing 2, of which it is worth making a mental note, is the SYS OS_File, 10 that is used to save the program in the library. This particular brand of OS_File not only saves a block of memory but stamps it with a filetype as well – &FFC in this case, meaning 'transient utility'. This avoids all sorts of bother with *SetType and looking up type values so, if you can, commit the parameters to memory!

As an aside, the other OS_File call I find particularly useful is:

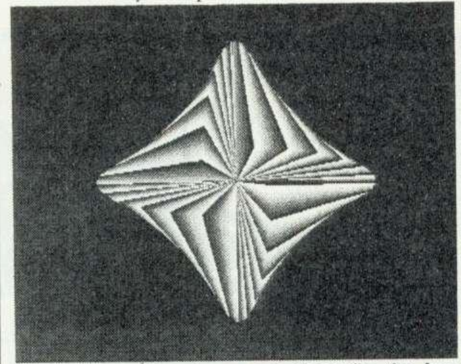
SYS "OS_File",5,"FileName"
TO ,,,,len%

where len% is the length of the specified file. This avoids having to use EXT# and so it is not necessary to open the file at all.

ONE LINER

I thought it was about time for a one-line bonus, so here's a rather special little computer doodle.

If you have any one-line doodles, one-line wordprocessors (yes – there really has been one), one-line anythings for that matter, why not send them in to the usual address given below. There'll be a fiver for any we publish.



Just type in the clever one liner (in the box below) to create the above doodle

```
10MODE 12:OFF:c=0:ORIGIN 640,512:t=PI/100:FOR s=0 TO 2*PI STEP t:c=(c+1) MOD 8:GCOL c+8:MOVE 0,0:MOVE 400*COS(s-t),100*SIN(s-t):PLOT 85,100*COS(s),400*SIN(s):NEXT:c=0:REPEAT:WAIT:FOR i=0 TO 7:k=&20*(i+c):COLOUR i+8,k,k,k:NEXT:c+=1:UNTIL FALSE
```

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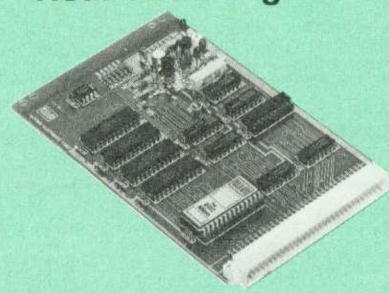
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Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air television signals may also be digitised via a video recorder or TV tuner.

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Applications include desktop publishing, graphics, animation, image analysis and recognition, medical imaging, automatic inspection and measurement, databases, interactive video, remote transmission of pictures via a modem, movement detection ... or anything else you can think of!

SPECIFICATION

SOFTWARE
All the driver software for the digitiser is contained in a ROM on the podule. Facilities provided include:
- Grabbing of images to the screen or dumping to memory.
- Continuous grabbing and display for previewing or camera alignment.
- 'Hot key' grabbing – pressing a (configurable) key combination grabs and displays an image on the screen while another program (e.g. paint software such as Artisan) is running.
- Scaling (zoom/shrink) any section of an image to any size in X and Y directions, with optional X/Y flip, window clip and logical (AND/OR/XOR) plotting.
- Rotation and scaling to any angle and size, rotating about any point, with optional window clip, and logical (AND/OR/XOR) plotting.
- Very versatile matrix printer screendump facility for Epson FX, LQ and EX compatible printers – pictures can be printed to ANY size (including multiple sheets) at any orientation, using any available printer density and one of six internal sets of dot patterns, or with user definable patterns (pattern editor supplied). The screen-dump can also be used for general purpose graphics screen printing.
- Pixel value lookup tables: pixel values can be passed through a user defined lookup table to allow contrast enhancement, thresholding pseudo-colouring etc.
- Smoothing and noise spot removal to enhance image quality.
- Creation of sprites from all or part of a digitised image.
- Saving and loading of digitised images in compressed format.
- Combination of pictures by adding, avaraging, subtracting, multiplication etc.
- Much faster versions of the Arthur *ScreenLoad and *ScreenSave commands.

Software facilities are accessed via operating system star (*) commands and SWI calls. High resolution screen modes using MultiSync type monitors are supported.

UTILITY DISK
A disk is included, containing sample pictures, examples and utility programs including the following.
- Colour image grabbing using colour filters with monochrome or colour cameras, including colour balance adjustment and scaling facilities.
- Pattern editor for 2 colour display modes and printer screendumps.
- 512 line interlaced display for non MultiSync monitors.
- Thresholding to create two colour images.
- Capture and replay of animated sequences.
- Several example programs illustrating the use of digitiser software.

RESOLUTION
Images are digitised to 512 (h) x 256 (v) pixels, and then scaled to fit the Archimedes' screen. It is possible to digitise to 512 x 512 pixels if the picture is stationary for about 0.1 second. 512 x 512 images can either be displayed on a MultiSync monitor, or on a normal monitor using interlacing.

Pictures are digitised to 64 levels of grey (6 bits). Note, however, that it is only possible to display all 64 levels on a monochrome monitor, or a colour monitor which has a composite (CVBS) input. For this reason, the Philips CM8533 monitor is recommended instead of the standard Archimedes monitor. It is also possible to connect both a colour and a monochrome monitor at the same time.

Any 2,16 or 256 colour graphics mode can be used to display digitised pictures. In two colour modes, grey levels are represented using dot patterns, which may be redefined if required (a pattern editor is supplied). **Cont.**

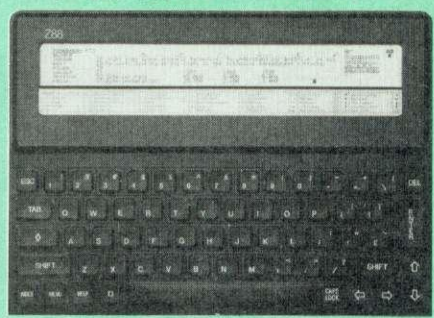
SPEED
Video fields are captured in real time (1/50th sec.), and then transferred to Archimedes' memory or the screen. The grab/display rate is dependant on the screen mode and picture size, up to 25 fields per second for quarter screen images, or 12.5 per second for fullscreen (Mode 9).

HARDWARE
The digitiser is a single width podule, with a BNC socket on the rear panel for the video input, which may optionally be terminated via a link. There is 128K of on-board memory to store the digitised image, and a 32K ROM on the podule contains all the driver software.

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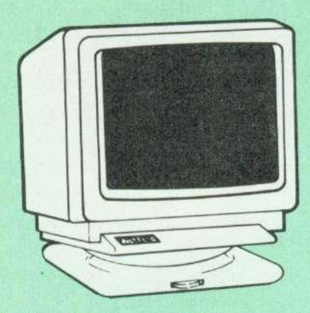
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Z88 Spellmaster for Pipedream	£51
Z88 to BBC Link	£21.70
Z88 to PC Link II	£30
Z88 to Macintosh Link	£49
Z88 EPROM ERASER	£34.75
Serial Printer Cable	£8.65
Parallel Printer Cable	£24.00
Z88 Modem	£145
Z88 Soft Carrying Case	£8.50
Sinclair Z88 Computing Book	£9.95
AA Nicad Rechargeable Battery	£1.50
Battery Charger, Compact & Fast (3 Hours)	£6

Continued


MONITORS



All Monitors are supplied complete with BBC connecting leads FREE.

MICROVITEC 14"

- 1431 – Standard resolution as used on the BBC television computer programme **£175**
- 1451 – Medium resolution, suitable for word processing in mode 0 **£219**
- 1441 – High res, exceeds the capabilities of the BBC micro **£359**
- 1431AP RGB + PAL and AUDIO **£199**
- 1451AP RGB + PAL and AUDIO **£255**
- **2030 CS 20" Med Res** **£380**
- **2040 CS 20" Hi Res** **£675**
- Dust Cover for Microvitecs **£5.50**
- **Touchtec 501 Touch Screen** **£239**

14" MULTISCAN COLOUR

- **TAXAN** Multisync 770 Plus **£449**
- **EIZO** Flexscan 80605 – For technical info. read the review in Micro User, Jan. '89 **£459**

TAXAN 12"

- TAXAN Super Vision 2 **Type 620** Hi-res RGB Colour, Green/Colour Switch **£265**
- TAXAN Super Vision 3 – **Type 625** Super Hi-res RGB Colour, Green/Colour Switch **£315**

PHILLIPS

- BM7502 12" Hi-res Green Monitor **£65**
- CM8833 14" Med. Res Colour Monitor **£219**

STAR BUY

- **PHILLIPS 14"** Medium Res, dark glass, attractively finished Colour Monitor – supplied complete with RGB, SKART and Audio/Phono Inputs. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £199

Dust Cover for Phillips Monitors **£6**

SPARE LEADS

BNC Lead for Zenith or Philips	**£3**
Skart Monitor Lead	**£5**
RGB lead for TAXAN Monitors	**£3**
Archimedes Colour Monitor Lead	**£7.50**

SWIVEL BASES

By simply placing your monitor on one of our front adjustable professional swivel bases (see drawing at the top), you can easily adjust the monitor viewing angle.

for 12" Monitors **£8** (carr. £2.50)
for 14" Monitors **£12** (carr. £2.50)

Anti-Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for all wordprocessor users. **£12**

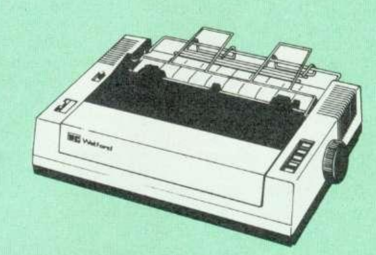
TAXAN KP-815 PRINTER

80 column, Bi-directional, 160 CPS, (NLQ 24cps); Friction & tractor feed + paper roll holder as standard; Epson FX compatible.

Offer Price £155

Taxan KP915 132 Column	**£275**
RS232 Interface	**£49**
RS232 Interface with 2K Buffer	**£69**
RS232 Interface with 16K Buffer	**£89**

Panasonic KX-P1081



Attractively finished in BBC beige. Bi-directional, logic seeking. Has IBM and Epson RX compatible command calls. Speed: 120CPS draft mode, 24 CPS NLQ mode. Character width range from 5 cpi to 17 cpi. Upto 40 downloadable characters. Functions include, Proportional spacing, Justification, centering and left & right ranging.

(Price inludes, FREE a 4ft Printer Lead, and a Dump Out 3, Screen Dump ROM worth £35 with every printer purchased from us).

SPRING SALE OFFER only: **£139**

Optional RS232 Interface: **£39**

NEW

PANASONIC KX-P1124

Watford Electronics, your authorised Premier Panasonic Dealer, brings you from the prodigious Panasonic Stables, this fabulous 24-pin printer.

Available NOW at a superbly realistic price, KX-P1124 perfectly balances features, quality of construction and Value for Money to produce the printer of tomorrow, here today, ready to sweep the current generation of machines away.

Ingenious innovation in terms of software control codes permits great flexibility when it comes to defining the print style. A nippy 192 cps of clear draft speed backs up the crisp 60 cps Letter Quality text mode, with 6 fonts. A delightful range of assorted character width is efficiently supported, with sizes ranging from a broad 5 to petite 20 CPI, even in LQ mode. Some of the extensive support for serious use includes, justification, centering, left and right ranging and proportional spacing.

A full 96 ASCII character set is supported with an extended set of Italic, 32 International (13 countries) and 158 IBM special characters. A 6K Print Buffer alleviates much of the wait time normally associated with printing, whilst the bi-directional logic seeking (character & graphics), print head takes the quickest route to print as required.

Simple paper parking and easy front loading of A4 sheets add an extra dimension. Not only Epson LQ & IBM Proprinter emulation modes are implemented, but extra codes have been added to cater for LQ option.

At less than 53dB, this is perhaps the quietest dot matrix printer on the market.

Watford's Launch Offer: **£269**

PANASONIC PRINTERS

- **KX-P1180** 9pin 80col. 192/38 CPS **£169**
- **KX-P1540** 24pin 80col. 240/80 CPS **£435**
- **KX-P1592** 9pin 136col. 216/45 CPS **£275**
- **KX-P1595** 9pin 136col. 288/61 CPS **£409**
- **Panasonic KX-P4450** LASER PRINTER Latest technology at Watford's special offer price **£1,499**
- Spare Toner **£29**
- A4 Feeder **£55**

INTEGREX COLOUR JET PRINTER

- Colour Jet 132 Printer **£515**
- Paper Roll **£6**
- Screen Dump Software **£10**
- Colour Cartridge **£14**
- Black Cartridge **£8**
- 100 A4 OHP transparencies **£55**
- 8K Serial Interface Optional **£123**

NEW – Intergrex COLOURCEL NPQ Ink Jet Colour Printer **£2,695**

NEC P2200 PINWRITER

24 pin; 80 column; 168CPS – 56CPS LQ; Epson LQ compatible, 7K Buffer; 7 resident FONTS, Friction & Tractor feed, front load single sheet feed, etc.

£269

Pinwriter Serial Interface (optional)	£55
P2200 Cut Sheet Feeder	£65
Additional Font Cartridge	£25
NEC P2200 Pinwriter Ribbon	£6

NEC PINWRITER P6/P7 Plus

The Ultimate 24pin matrix Printer for Business.

NEC P6+ 80 columns	**£439**	**NEC P7**+ 136 columns	**£575**
Colour Option	**£74**	Serial Interface	**£73**
Cut Sheet Feeder	**£125**		

Star LC10	**£175**	**LC10 Colour**	**£215**
Star LC24-10	**£279**	**NB24-10**	**£399**

Brother HR20 DaisyWheel Printer **£339**

EPSON PRINTERS

EX800	**£405**	LQ850	**£430**
EX1000	**£564**	LQ1050	**£570**
FX850	**£315**	LQ2550	**£925**
FX1000	**£425**	LQ2500+	**£839**
FX1050	**£439**	LX800	**£175**
LQ500	**£275**	SQ2500	**£975**
GQ3500 Laser	**£1150**		

PLOTTERS

Hitachi 672 Colour Plotter	**£475**
Plotmate Plotter A4S	**£379**
Plotmate Plotter A3M	**£549**

CUT SHEET FEEDERS for

EX800 **£149**; EX1000/LQ2550 **£210**; FX800 **£149**; FX1000 **£179**; LQ/LX800 **£139**; LQ500 **£75**; LQ850 **£135**; LQ1050 **£175**.

TRACTOR FEED for

EX800/1000 **£85**; LQ800 **£44**; LQ850 **£69**; LQ1050 **£85**; LQ2500 **£195**

ACCESSORIES

- EX800/1000 Colour Option **£55**
- EX800/1000 Colour Ribbon **£18**
- LQ2500 Colour Option **£65**

(Securicor Carriage on Printers £7

EPSON PRINTER INTERFACES

All these interfaces fit inside the printer.

RS232	**£32**	RS232 + 2K Buffer	**£52**
IEEE 488	**£40**	RS232 + 8K Buffer	**£79**

PRINTER LEADS

BBC Centronics 4' long	**£5**
BBC Centronics 6' extra long	**£7**
Compact's Special Centronics Lead	**£7**
Archimedes Printer Lead 1 meter	**£6**
Nimbus Centronics Lead	**£12**
IBM Parallel Lead 1 meter	**£6**
Double Ended 36 way Centronic Lead 4'	**£7**
Double Ended 36 way Centronics Lead 6'	**£9**
MSX Centronics Parallel Lead 4'	**£12**
RS232 Leads (Various)	**P.O.A.**

RS-232 GENDER CHANGERS

Male to Female	**£4.95**
Male to Male	**£4.95**
Female to Female	**£4.95**

Listing Paper (Perforated)

- 1,000 Sheets 9½" × 11" Fanfold Paper £7
- 2,000 Sheets 9½" × 11" Fanfold Paper £12
- 1000 Sheets 9½" x 11" NCR 2 Part Fanfold £19
- 1,000 Sheets 15" × 11" Fanfold Paper £9
- 1000 Sheets true A4 Fanfold Paper £11
- 2000 Sheets true A4 Fanfold Paper £19
- Teleprinter Roll (Econo paper) £4

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50. 2K Sheets £3.00

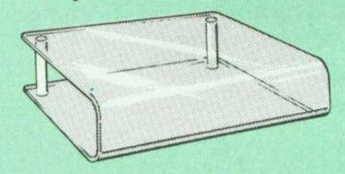
PRINTER LABELS

(On continuous fanfold backing sheet)

1,000 90 × 36mm (Single Row)	**£5.00**
1,000 90 × 36mm (Twin Row)	**£4.90**
1,000 90 × 49mm (Twin Row)	**£7.50**
1,000 102 × 36mm (Twin Row)	**£6.25**

Carriage on 1,000 Labels £1.00

Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand. The printer sits on top and the fanfold paper rests neatly underneath, thus occupying the same space as the printer footprint.

Only: £16 (carr. £3)

Professional Printer Stand



This new professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Additional facilities include: Easy access to paper from both sides, used with both top and bottom feed paper and with its dial controlled paper feed system with adjustable deflector plates it ensures smooth paper flow and automatic refolding.

***80 Column version £23** (carr. £3)*

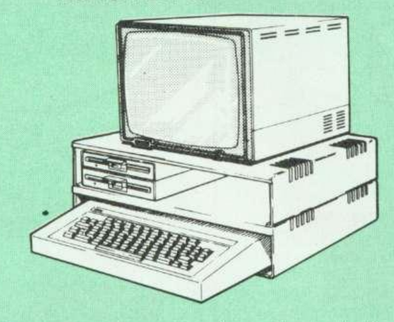
***132 Column version £26** (carr. £3)*

PRINTER RIBBONS & VARIOUS DUST COVERS

Type	Ribbons	Dust Covers
BBC Micro	–	£3.50
BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
IBM PCs pair	–	£6.00
Brother HR15/20	£3.00	£5.00
DMP2000	£3.75	£4.75
EX/LQ800	£4.50	£4.50
EX/LQ1000	£7.50	£5.00
RX/FX80/85/800/MX80	£3.90	£4.95
RX/FX100/1000	£5.75	–
Kaga/Taxan KP810/815	£4.90	£4.00
LC10 (Black)	£4.25	£5.00
LQ500/800	£3.75	£5.00
LQ1050/LQ2500	£8.50	£5.50
LX80/86/800	£3.80	£4.50
M1009/GLP	£3.80	£3.75
Panasonic KX1080/81	£4.00	£4.75
SQ2500	£23.00	£5.50
Star NL10	£3.75	£4.50
Olivetti Ink Jet Cartridges (set of 4)	£9	

Our attractive Dust Covers are manufactured from translucent PVC. The seams are stitched and edges are taped to prevent splitting due to continuous use.

PLINTHS FOR BBC MICRO, MASTER & PRINTERS



Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationary. The computer slides neatly in the lower section allowing easy access to remove the lid.

The single printer stand is equally sturdy but instead of cooling slots it has elegant cutouts on the sides. This allows easy access to paper from all sides. Colour: BBC Beige.

Single BBC Plinth	**£12** (carr. £2)
Double BBc Plinth	**£20** (carr. £3)
Printer Plinth	**£12** (carr. £2)
Single Master Plinth	**£13** (carr £2)
Double Master Plinth	**£24** (carr £3)

Universal Printer Sharers/Changers

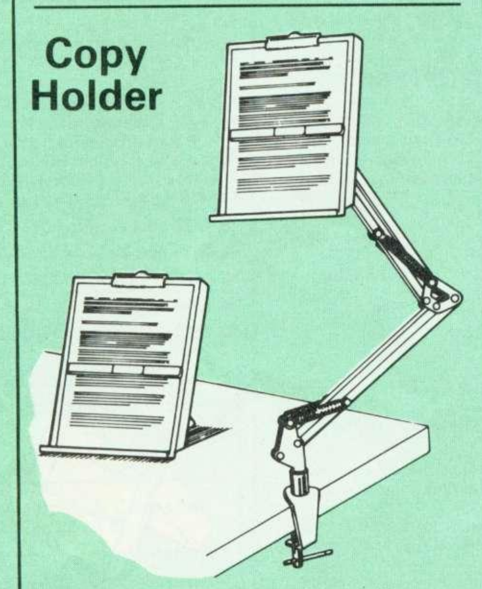
Connect upto 5 Micros to 1 printer or 5 Printers to 1 Micro with our combined, Sharer/Changer. These Units are made to a very high standard. For extreme reliability, they all have Printed Circuit Boards mounted inside the case, (not a Spagetti Junction of wires). Internal connection is made via high quality ribbon cables.

(Ideal for School environments.)

Connects	Serial	Centronics
2 to 1	£20	£22
3 to 1	£27	£30
5 to 1	£36	£39

(Cables extra at £5 each. Please specify type required when ordering)

Copy Holder



Whether you want to type in your latest program or the draft of a new trilogy, Watford's manuscript holders are superb for holding your paper at the ideal height and angle to allow you to read and type in ease and comfort.

Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip. (for resting books or magazines, the desk top version is recommended).

Desk Top **£10** (carr. £3)

Angle poise **£14** (carr. £3)

MEGABUFFER 256



The Smallest 256K Printer Buffer Unit in the world **38mm x 130mm x 134mm**.

This new Megabuffer 256 from Watford is a full featured 256K Printer Buffer. It allows the computer to print 256,000 character in a short time thus freeing the computer very quickly. In short it makes light work of printing large documents, screen dumps, etc. It is extremely simple to connect. The features are:

- Improves efficiency by making more efficient use of computer and printer.
- Compatible with any computer and printer that uses Centronics Parallel connections including all BBCs, IBM PCs, etc.
- Total compatibility with all software.
- Cheaper phone bills when using your Modems.
- Ideal for those doing large graphics screen dumps that are slow to print.
- Multi-Copy facility allows you to print several copies via Megabuffer without going through your computer.
- Data Dump facility is included.
- Built in test unit for both the buffer & your printer.

In conclusion it can safely be said that MEGABUFFER 256 is the ultimate printer Buffer for both the amateur and professional user.

Only £149 (carr £5)

OKIMATE COLOUR PRINTER

The first ribbon transfer printer in its price range which offers fully versatile colour or black printing. A 24 element print head produces more than 100 shades with exceptional clarity. Ideal for use with Quest Paint or AMX Super Art.

Only: **£119**

BBC Screen Dump	**£10**
Colour Ribbon	**£6**
Black Ribbon	**£6**

THE EPSON RX-FX-KAGA PRINTER COMMANDS REVEALED

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out. Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible Printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from BASIC and Wordwise.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

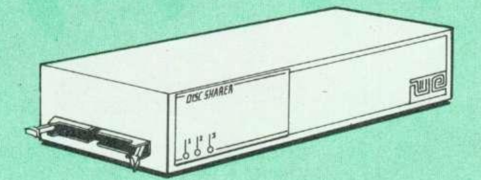
£5.95 (No VAT)



CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

Continued 

DISC DRIVE SHARER



(Ideal for educational establishments)

At last, a low cost alternative to the Econet system. Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Launch Price: **£65** Price includes 3 Cables

NOW WITH EXTRA FEATURES AT NO EXTRA COST – Watford's latest DFS 1.44

- Incorporates Acorn's Official Tube Host Code so that those with 2nd processors no longer need to waste a ROM socket on the DNFS.
- Option to DOUBLE the speed of BPUT and BGET.

WATFORD's & ACORN's DFSs

Watford's popular and widely acclaimed DFS has now been available for six years and has gained a large following amongst serious and educational users of the BBC Micro. Owners of Acorn or any other standard DFS can upgrade to our "Ultimate" DFS merely by replacing their DFS ROM. See below for this upgrade. ***(P.S. Watford's highly sophisticated DFS is fully compatible with Acorn standard DFS). (while Acorn's 1770 DFS is fully compatible with Watford's Mk II DDFS)***

- *Watford's sophisticated DFS ROM only* **£16**
- *We will exchange your existing DFS ROM for Watford's Ultimate DFS ROM for only* **£12**
- *DNFS ROM only* **£17**
- *ADFS ROM only* **£25**
- *DFS Manual (Comprehensive)* *(no VAT)* **£6.95**

(P.S. Our DFS manual is the only comprehensive Manual available for the BBC micro and covers both Acorn & Watford DFSs).

(The Single Density DFS system is now old technology. Like Acorn, Watford too have decided to replace it with their more up-to-date 1770 DDFS interface. We have informed most of the software houses of this decision in order that they can ensure compatibility with our highly sophisticated and fully Acorn compatible DDFS).

NEW

Watford's MkII 1770

Double Density DFS Interface

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features:

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£30.00**.

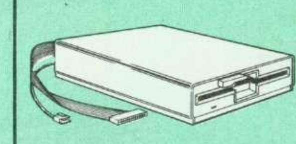
- Special introductory offer **£39.00**
- DDFS Manual (No VAT) **£6.95**
  - We will exchange your existing DFS Kit for our sophisticated DDFS for only **£25.00**

Please note, as the MkII DDFS is a hardware and software upgrade, it is not possible for existing Watford DDFS users to simply exchange their ROM for the new version.

DUST COVERS (For our Disc Drives)

Single CLS (without PSU) **£3.20** Twin CLD (without PSU) **£3.85**
Single CS (with PSU) **£3.95** Twin CD (with PSU) **£3.90**

Special 40/80 Disc Drive/DDFS Mk II Offer



- The popular 40/80 track 400K single Disc Drive, Double Sided, cased with Cables. Plugs directly to your Micro.
- Watford's extremely popular DDFS Disc Interface (allows 720K storage). Will run in both, Single & Double Density modes.
- A comprehensive User Friendly Manual.

A Bargain at Only **£123** (£7 carr)
(Offer valid while stocks last)

3½" DISC DRIVE OFFER



These top quality 3½" Double sided, 80 track, 1 Megabyte (unformatted each Disc Drives), are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc. They run directly from the BBC B/Master's own PSU.

- **CLS35 400K Unit** **£69**
- **CLD35 800K Unit** **£126**

Mysteries of Disc Drives & DFS Revealed

Are you tired of faulty cassettes, and lengthy loading times? Do you want to upgrade your BBC micro to take discs but you get tied up in the plethora of jargon surrounding the choice and use of these systems.

Then The Mysteries of Disc Drives and DFS Revealed is the book for you. It explains in detail the different types of systems available, how they are installed and how to use them. Many examples are given including pre-written programs to call various functions of the DFS available only through Operating System calls. Different types of disc, 40/80 tracks etc. are all explained. This book is ideal for the beginner confused by the plethora of choice available in the marketplace.

£5.95 (Book No VAT)

DISC ALBUMS

Attractively finished in black leather look vinyl. Stores upto 20 Discs. Each disc can be seen through the clear view pocket.

£4

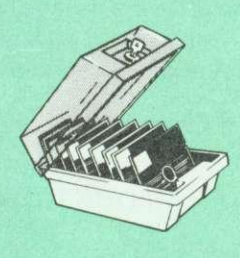
FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of a cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use. Available in 3½" & 5¼", please specify.

£4

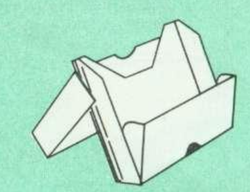
ANTISTATIC LOCKABLE DISC STORAGE UNITS

Gives double protection – Strong plastic case that affords real protection to your discs. Antistatic helps avoid data corruption whilst in storage. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.



- **M35** - holds upto 50 5¼" discs **£4.95**
- **M85** – holds upto 95 5¼" discs **£6.95**
- **M25*** – holds upto 25 3½" Discs **£4.95**
- **M50** – holds 50 3½" Discs **£6.50**
- **M10** – holds upto 10 Data Cartridges **£15**

* Not lockable



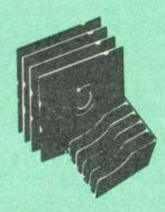
PLASTIC LIBRARY CASES

Holds up to 10 5¼" Discs. **Only £2.00**

DISC PLONKER RACK

When using ones micro, there is a tendancy to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk.

Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. It holds up to eight 5¼" Discs.



Protection at Only: **£2**

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.

The first capacity given in the first column indicates capacity in single density mode. That within the brackets is the capacity in double density mode. All disc drive type numbers start with the prefix "C".

The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). All our 80 track drives are already fitted with a 40-80 select switch.

***All our Disc Drives are Double Sided and will operate in both Single and Double Density modes.** Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*

Various UK "manufacturers" of disc drives for the BBC micro (more accurately, "packages" label other manufacturers drives with their own name). We buy the high quality NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

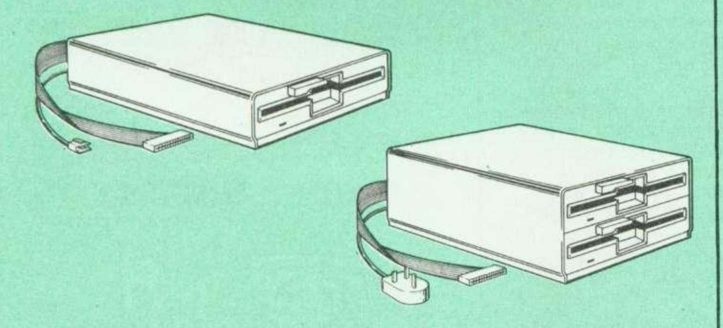
If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. Ideal for Schools & Colleges. We are now able to supply all single disc drives with Power Supply, in either single or dual case. (Dual case has a twin data cable and a power supply capable of driving two disc drives) allows easy expansion to a dual drive unit, at a later date. Prices stated in the pricing boxes below are for single drives in standard single cases. Single drives in a dual case cost an extra £10. (At Watford we anticipate your needs of tomorrow, not just today)!

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space) your BBC, Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with Watford plinth. (Turn to the 5th page of our advert for the Plinths).

P.S. All our 5¼" Disc Drives with PSU are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.

Our Disc Drives conform to BS415



"Test Bureau Approved for Use in Education"

Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
400K (720K)	CLS400S £79	CLD 400 £168	CS 400S £89	CD400 £188
800K (1.44M)		CLD 800S £159		CD 800S £169

● TWIN Disc Drive Case, complete with Power Supply & Cables **£43**
Securicor carriage on Disc Drives £5 to £6

*Prefix **C** = Cased Drive*
***L** = Less PSU*
***S** = Single*
***D** = Double*

*Suffix **S** = 40-80 Switchable*

e.g. CLS400S = Cased Disc Drive, Less power supply unit, single 5¼" 400K, (720K in double density); Double sided; 40/80 track switchable.

Cable to connect 5¼" Disc Drives to BBC Compact
Single £9 Twin £12
Special Cable to connect both 3½" and 5¼" Disc Drives simultaneously to the BBC Compact £13

3M – DISKETTES

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electronics your 3M Appointed Distributor.

- *10 × 5.25" S/S D/D 40 Track Diskettes (744)* ***£6.00***
- *10 × 5.25" D/S D/D 40 Track Diskettes (745)* ***£7.00***
- *10 × 5.25" S/S D/D 80 Track Diskettes (746)* ***£11.50***
- *10 × 5.25" D/S D/D 80 Track Diskettes (747)* ***£11.00***
- *10 × 5.25" 1.6M D/S D/D High Density Discs for IBM XT and AT* ***£16***
- *10 × 3.5" S/S D/D 40/80 track Discs* ***£10.00***
- *10 × 3.5" D/S D/D 40/80 track Discs* ***£11.75***
- *10 × 3.5" High Density Diskettes* ***£25***

TOP QUALITY 3½" & 5¼" DISKETTES

To complement our range of Quality Discs and Disc Drives, WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

- *10 × **M3** 3.5" D/S D/D 80 Track Discs* ***£11***
- *10 × **M9** 3.5" Double Side High Density* ***£25***
- *10 × **M4** 5.25" S/S D/D 40 Track Discs* ***£5***
- *10 × **M5** 5.25" D/S D/D 40 Track Discs* ***£7***
- *10 × **M7** 5.25" D/S D/D 80 Track Discs* ***£9***
- *10 × **M8** 5.25" D/S H/D Hi-Density Discs* ***£14***
- *3" Double Sided Discs* ***£2.50 each***

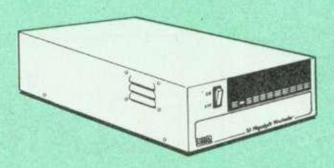


Special BULK OFFER on 5¼" DISCS

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

BULK PACK DISCS in lots of 100

Type	S-S 40T	D-S 40T	D-S 80T
● Without Sleeves	£35	£39	£45
● With Sleeves	£38	£42	£48



WATFORD's WINCHESTER DRIVES

Undoubtedly the best value for money Winchester Hard disc available anywhere for the BBC Micro.

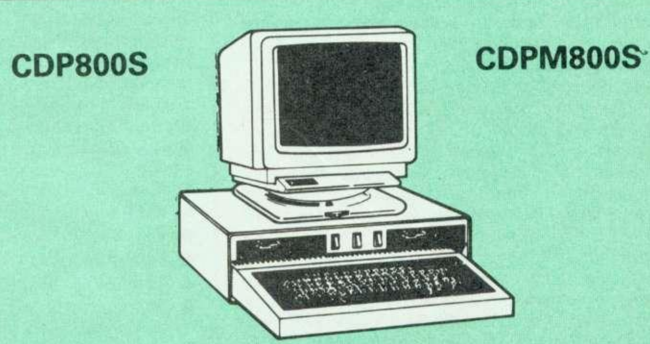
This 30 Megabyte hard disc is completely compatible with the Acorn ADFS – that's why we have bundled it with each Winchester drive, along with a Utilities Disc.

Finished in rugged metal and fetching BBC beige, the Winchester has an internal fan, so quiet you won't even hear it! A switched mode power supply and a neon-lit on/off switch are there along with a light on the hard disc to tell you when it is working – just compare the price with our competitors' 20 or 28 Mbyte discs!

Compatible with the Master, and the BBc B (with 17 X disc interface).

● 10 Megabyte **£350**; ● 30 Megabyte **£405**
(Securicor Carriage £9)

CDP800S CDPM800S



Twin 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

CDP 800S for BBC Micro £182
CDPM 800S for Master £183
DP35-800 for BBC/Master £169
(For DP35-800S spec. see Page 12 of our advert)

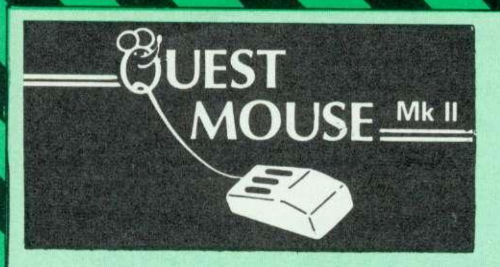
(Securicor Carr. £7)

(The above drive units are 2 Megabytes unformatted)

Continued







QUEST MOUSE MkII

The ultimate in Mouse technology, the Watford Electronics Quest Mouse must be the most powerful Mouse package yet produced for the BBC Micro. Featuring state of the art 32K ROM software the Quest Mouse package is filled with features essential to the budding artist. The Quest Mouse is a high precision, low profile and large footprint mouse. It has three large comfortable buttons and its RUBBER COATED STEEL BALL is smooth and easy to use on virtually any work surface. This also eliminates any directional bias that one encounters on the most well-known mouse for the BBC. The Quest Mouse is FULLY HARDWARE COMPATIBLE with the AMX MOUSE so that it will work with any of the AMX range of software.

The two parts of the Quest package are available separately so that existing Mouse owners can upgrade to the Watford's sophisticated Quest Paint software or replace their existing worn out mice for a minimum cost.

QUEST PAINT

The Quest Mouse software is supplied on a PALPROM unit to allow the sophisticated 32K program to be used from a single ROM socket. It is compatible with the BBC B, BBC B Plus and BBC Master Series machines.

The software is used to draw high resolution Mode 1 pictures in full colour. All menu selection and control of the drawing process is performed with the mouse so that you will hardly ever touch the keyboard.

SOFTWARE FEATURES

The software is far too powerful for us to describe it fully in such a small space. Below is a list of the various features. Please write to us for a fully descriptive leaflet.

Disk interface not required. Utilities disk has facility to create and print big screens. Colours applied can be solid, either pattern of user defined pattern. Drawing can use brush or airbrush. Brush shapes can be defined and stored. Airbrush sprays colour/pattern randomly with four jet sizes and even or center spread. Colour cycles. Colour protection to stop particular colours from being overwritten by selected drawing actions. All standard drawing facilities like: rubber, straight pencil lines, triangles, circles, ellipses, rectangles, parallelograms, polygons, etc are provided. All shapes can be solid or just a boundary line. Once a shape has been set up it can be repeated anywhere on the screen. Global colour replace in a rectangle. Powerful fill facility for areas and vertical/horizontal lines. Full cut and paste of rectangular areas with rotation and size with screens from Watford Beeb Video digitiser. Load and Save screens with colour pallet information, save brush and pattern definitions etc.

Take The Guesswork Out of Selecting a Mouse Package
With reviews like this how can you go wrong.

A&B Computing June '87

"... you will have one of the most comfortable and professionally built mice I have used in a long time. The buttons are responsive, the mouse movement is smooth and without directional bias – a pleasure to use."

"What we have here is probably the best art package there is for the BBC Micro ..."
"Quest Paint is a major leap forward in BBC programming..."
"Quest Paint is an original piece of programming, it is friendly and well endowed with many useful facilities. I would comfortably say it is easier to draw good pictures with Quest Paint than it is with more expensive 'Professional' art packages for the Atari ST and the Commodore Amiga. A recommended buy if you are looking for the best in BBC micro based art packages".

Acorn User, September '87

"... this package represents excellent value for money. If you are interested in art then this program is for you to buy".
"All in all, Quest Paint is a very professional package. It contains virtually every feature the budding artist could require".

Quest Mouse II & Quest Paint	£58
Quest Mouse II, Quest Paint, AMX Stop Press & Pagefont	£89
Quest Mouse II only	£26
Quest Paint Software only	£34
Quest Font Disc	£15
Quest Mouse Mat (Red or Blue please specify)	£3
Part Exchange your unreliable AMX Mouse for a Quest Mouse for only	£22
GXR ROM for the BBC Micro	£22

(P.S. Quest Paint is not compatible with BBC Compact)

N.B.
1. Quest Paint supplied complete with Software in a 32K ROM, Comprehensive User Guide and a Utility Disc.
2. Quest Font Disc has 22 text FONTS for use within Quest Mouse.

ConQuest

Watford's Quest package is an extremely powerful and flexible drawing package, with very wide and unusual features. However, since its launch various suggestions for even more advanced & powerful facilities were received from the Quest users. ConQuest allows you these more advanced facilities, like, distortion of a cutout to any shape and a full font designer. If you also have a GXR ROM in your machine or you are using a BBC Master then ConQuest will take advantage of this to give ellipses at any angle, sectors and arcs, etc. Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.
Some of the features are:

- *Pick filenames off the screen for loading and saving.*
- *Rotate a cutout to any angle and Distort it to any four sided shape.*
- *Has Built in Font editor.*
- *Default brushes and patterns on startup.*
- *16 x 16 font available on start up.*
- *Ability to reset patterns, fonts and brushes to default at any time.*
- *ROM based enhanced Epson and compatible printer dump.*
- *ROM based enhanced extended picture routine.*
- *Ability to create and abort extended pictures.*
- *Improved disk access speed for extended pictures.*
- *User definable sideways RAM driver for incompatible sideways RAM systems.*
- *Ellipses at any angle on Master 128 (or B with GXR ROM).*

ConQuest ROM Package **£30**
(Price includes software in ROM and a comprehensive Manual).
(Not Compatible with BBC Compact)

RB2 Marconi
TRACKER BALL

RB2 (AMX/Quest compatible)	£45
RB2 including Quest Paint	£75

FLEET STREET EDITOR

Software pack for BBC Micro	£33
Software pack for the Master	£39
Software Pack for Compact	£40
Admin Xtra Disc Utility	£13
Walt Disney Disc Utility	£13
Fonts N Graphics Disc Utility	£13

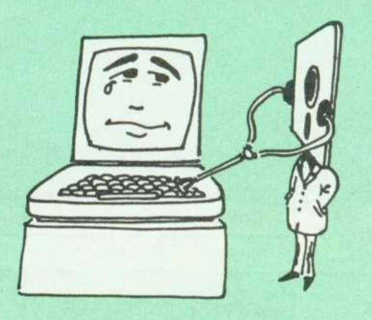
THE NEW Mk III AMX MOUSE

ONLY: £59 **Inc. Super Art package**
(carr £3)
(Please specify for BBC, Master or Compact)

FREE our popular Colour Art software pack worth £15 with every AMX Mouse package purchased from us.

MOUSE MAT	£3
AMX MOUSE ONLY	£29
AMX UTILITY Package	£11
AMX SUPERART Package	£34
AMX STOP PRESS – A Desktop publising software. Works with Keyboard, Joystick or a mouse	£32
PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker	£12
AMX DESIGN (ROM)	£55
AMX XAM Educational	£15
AMX EXTRA EXTRA	£16
AMX MAX A gem of desktop (ROM)	£15

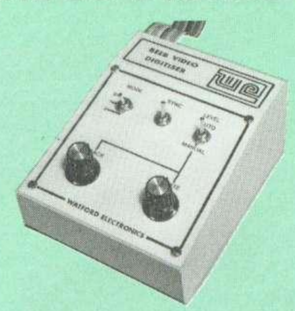
DIAGNOSTICS DISC



The BBC Micro is a very complex machine and thus diagnosing a fault can be very difficult. At Watford Electronics, we realise how difficult it can be when faced with a problem, finding yourself a long way from your nearest dealer, or even just uncertain about your Beeb's health, but not wanting to waste time and money taking it to be looked at.
The solution to these problems is here now, in the form of the Watford's Diagnostics Disc. This excellent utility is specially designed to test out the following areas of your Beeb:
RAMs, ROMs, ULAs, Sound, Keyboard, Disc, RS423, ADC, User Port, Printer Port, Cassette, Joysticks, Speech, Disc Drives, 6502 and Z80 2nd Processors.
This utility is an invaluable aid for all those who take the reliability of their system seriously. A comprehensive manual provides full operating details and a list of possible causes and remedies for any faults that you may find along the way. The package also enables a permanent equipment and service record to be maintained.

Only £20.00

BEEB VIDEO DIGITISER



"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.

This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem.

The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

Both the black and white levels can be adjusted manually for the optimum picture, or switched to automatic for unattended use. The image produced can be reversed if necessary.

Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional * commands. The package i designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROMs to work on it.

A special print dump routine is included with the driver programs. This is specially designed to produce a fast, correctly proportioned picture, with reduced "contouring", resulting in an accurate reproduction of the original image.

Detailed examples of driving this unit from BASIC or other languages are all provided in the extensive manual supplied.

£109 (Carr. £5)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)
(BBC B+ and Master compatible, except Master with Econet)

Magazine Maker

(As seen on TV)

A combination of the Pagemaker and Watford's Beeb Video Digitiser.

Using any video that provides a composite signal and the digitiser, images from a camera or TV can be converted into a graphics screen on the BBC Micro.

They can then be used within Stop Press to illustrate magazines or newsletters – in fact anything that needs to be created on A4 size paper.

With Stop Press's many features, a variety of pictures can be composed – the only limit being the imagination.

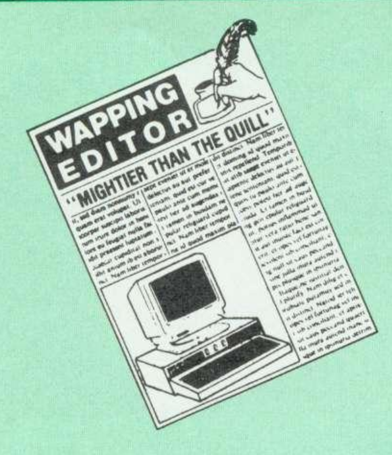
Pictures can be doctored using Stop Press's graphics option to produce any number of effects.

Text can be formatted around the digitised photo on screen using the facilities available, which include 16 typefaces, character and pattern definer, text formatting and the ability to load in wordwise and viewfiles plus much more.

Once created the picture can be printed out.

The Magazine Maker is suitable for any use that requires illustrated documents.

Complete Package **£135.00** (carr. £3)



Watford Electronics bring professional quality Desktop Publishing to the Beeb. The Wapping Editor is a totally self contained mouse-driven desktop publishing package designed to run on the BBC B, B+ and Master computers. The massive 64K Rom contains ALL the software you need to do your own publishing. It 'Brings the Freedom of Press' to your fingertip. The software has a word processor, a graphics package, a page layout section and a font designer. Although very sophisticated, Wapping Editor is simplicity itself to use. Anyone already familiar with Quest Paint will immediately feel at home.

GRAPHICS PACKAGE

Imagine Quest Paint re-written to take advantage of the high resolution of Mode 0, well this is it. The Wapping Editor could well be worth buying for this facility alone. This must surely be the graphics.

WORD PROCESSOR

This section is a fully functional word processor specially tailored to suit the Desktop Publishing environment. Gone are all the unnecessary and cumbersome text formatting commands – these are dealt with in the 'Page-Layout' section. The features of this word processor include wordwrap, wordcount, insert/overwrite, move block, copy block, delete block, search and replace, browse, etc, many of these features being mouse controlled. Text input can of course be taken from existing word processor files like Wordwise, View, etc, but it is not necessary to have a separate word processor in order to use this package.

PAGE-LAYOUT SECTION

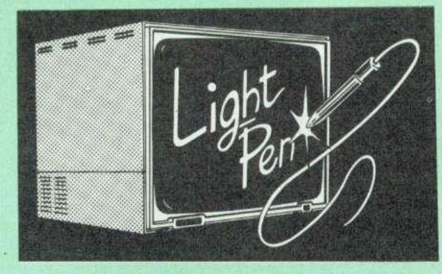
Page Layout becomes easy using these mouse-driven routines. The user simply 'pulls' a rectangle onto the page and states which text document or graphic is required to fill the space – it's as simple as that! Text can be automatically printed in a pre-set number of columns, left justified and/or right justified, or centered. Several different typefaces can be held in memory at one time. Graphics may be stretched, squahsed or cropped to fit any size rectangle. Graphics input can be from the software provided in the package or, using the 'mode convert', from any graphics mode screen.

THE FONT EDITOR

This is an enhanced version of the font editor contained in the Con-Quest ROM and allows the editing of ALL 95 characters. As well as being able to design your own typefaces; fonts from other DTP packages or from Quest Pain may be loaded into the editor and converted for use with the Wapping Editor. This sophisticated editor has numerous functions including slide, flip, invert and rotate individual characters or the whole font. Individual characters can be mirrored or copied and a mask feature allows you to superimpose two characters. Lines and columns can be inserted or deleted allowing the character to be stretched or squashed. This font editor will also allow 'font' and 'brush' files to be designed for use with Quest Paint.
This package is the latest in the line of integrated professional quality mouse-driven software from Watford Electronics, the company that adds power to Beeb.

Wapping Editor — Launch Offer: **£69**
Wapping Editor with Quest Mouse — **£89**

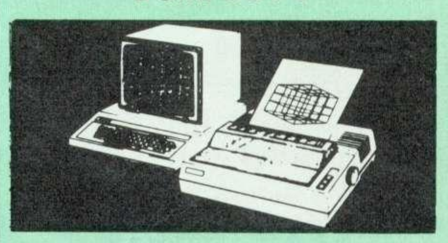
MARK II LIGHT PEN



Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted.

Price Only £21

DUMPOUT 3



A highly sophisticated screen dump ROM. This has to be the most flexible and powerful screen dump ROM yet produced for the BBC micro. It will put on paper anything you see on the screen, including full Mode 7 graphics.
Also provided are window setting utilities and OSWORD calls to plot and read Mode 7 graphics pixels.
Facilities:

- Vertical and horizontal scaling in all graphics modes and mode 7
- Rotation of image by 90, 180 or 270 degrees
- Left hand margin setting
- Screen dump window setting
- Colours appear as grey scale
- Two tone fast dump
- Colour mask
- Mode 7 contrast expansion
- Mode 7 contiguous dump
- Key triggered and User Port triggered dumps

The Micro User Feb. 1985.
'Without reservation I wholeheartedly recommend the Dump Out 3 ROM as the ultimate screen dump facility for the BBC Micro . . . it must represent excellent value for money and surely cannot be beaten".

For use with the following printers:
GLP, GP80/100/250, CANNON, STAR, KAGA/TAXAN, NEC, SHINWA CP80, GEMINI, EPSON MX/RX/FX, M1009, NEC PC8023, DMP100/200/400, Panasonic KX1081/82, Mannesman Tally and compatibles.

Only: £25



CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

Continued



ARIES CORNER

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Comal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved *FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on your BBC micro – no flying leads to connect and no soldering. Provision of the on-board ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£80** (carr. £2)

Aries B-12 Sideways ROM Board

This board is extremely well made, simple to install, reliable when fully loaded and compatible with the Aries-B20 and the Aries-B32.

The B12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

The B12 system consists of two parts: a large detachable "mother board" which carries the extension ROM sockets and a small "base board" on a short ribbon cable, which plugs into the existing sideways ROM sockets. This two-board design eliminates the reliability problems previously associated with some other ribbon-cable based systems.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost.

Price:	
Aries B-12	£40
Aries B-12C	£5



ARIES B-488 IEEE-488 INTERFACE UNIT

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB' or 'HP-IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

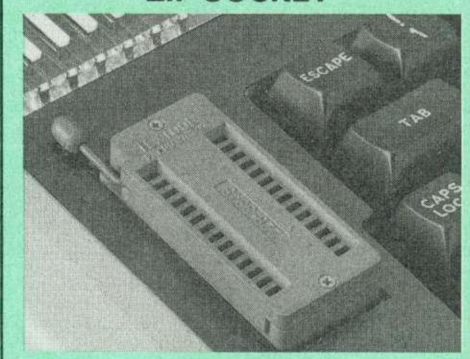
£238 (Carr £3)

EXTERNAL ROM BOARD for BBC MASTER

This external Beige finished, free standing cased unit with its own Power Supply allows you to plug-in upto 12 ROMs and 16K Sideways RAM.

Only £78

SIDEWAYS ZIF SOCKET



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for all professionals and Hobbyists alike.)
- BBC, B+ and Master compatible.

ONLY **£18** (carr £3)

Low Profile CARTRIDGE SYSTEM

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

Complete System	£11
Spare Cartridges	£2.50
Spare Rack	£1.50

ROM Cartridges for the BBC Master
Twin **£8**; Quad **£12**

16K DISC RAM

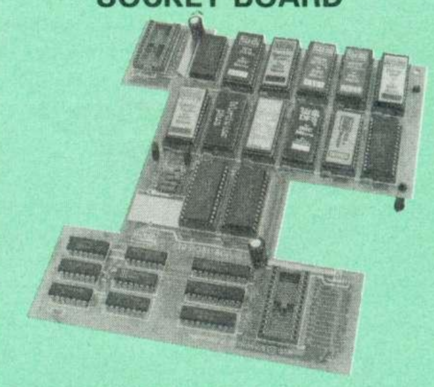
Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances).
- Compact construction.
- Supplied complete with Battery Backup.
- No overheating or overloading problems.
- Free utilities disc supplied.
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

Only: **£35** (carr £2)

P.S. 16K Disc Ram Board is not designed to work in conjunction with a Sideways ROM Board.

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



In the May 1986 Micro User's independent review, the writer concludes, "The board has been well laid out. Its position is much better than others – not over the HOT RAM chips and further away from the disc controller area". "I give the solderless ROM board the thumbs up and wish it success".

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16.

Unlike our competitors inferior boards, the ONLY upgrade required for fitting battery backup to the Watford Solderless ROM board (all Watford ROM boards, actually) is the fitting of the battery itself. (No other expensive components are required.)

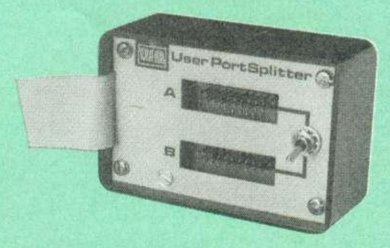
- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £35
Battery backup fitted **£39**
Battery Backup only **£3**
(carriage £2)

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

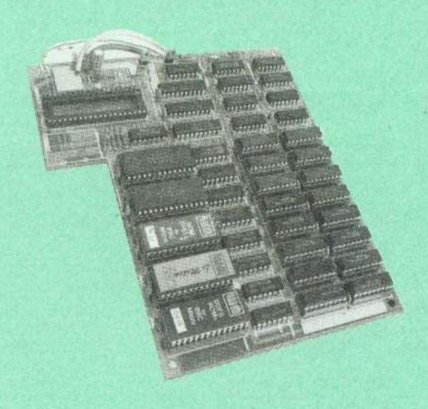
USER PORT SPLITTER UNIT



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaniously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination.

Excellent Value at **£22** (carr £2)

ROM/RAM CARD



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 3 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- No User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with all BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of Battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Accepts any ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE Fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROM-SPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later:

Please write in for further details.

INTRODUCTORY PRICES:

- ROM/RAM card with 32k dynamic RAM ***£48***
- ROM/RAM card with 64k dynamic RAM ***£65***
- ROM/RAM card with a massive 128k dynamic RAM **£109**

(carriage on ROM-RAM Card £3)

OPTIONAL EXTRAS:

- 16k plug-in Static RAM kit **£17**
- 16k Dynamic RAM for Upgrade **£17.50**
- Battery backup **£3**
- Read and Write protect switches .... **£2 each**

Complete ROM-RAM board
All options installed **£115**

P.S.
Is your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford ROM/RAM Board and pay £5 less

Le Modem



The MODEM from Watford

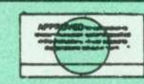
The features that make Le MODEM such good value are:

- *Auto Dials, Auto answers, and is completely controlled by your micro. There are no external controls!*
- *Allows you to access PRESTEL, B.T. GOLD, THE SOURCE, MICROLINK, MICRONET, MICROWEB, THE TIMES NETWORK, MICRO LIVE (BBC TV database), CITY BB and more.*
- *Supplied with a comprehensive telecomms package in a 16K sideways ROM which includes a FULL PRESTEL terminal allowing TELE-SOFTWARE to be downloaded.*
- *A comprehensive 80 column terminal. This includes XMODEM error checked transfer protocol, to allow error free data transfer anywhere in the world!*
- *FULLY controlled by simple "*COMMANDS allowing you to control it from your own BASIC programs. To get you started we supply a FREE disc of bundled software!*
- *Connects to the 1MHz bus. A *AUDIO ON-OFF command allows you to actually hear the telephone line through your BBC micro loudspeaker.*
- *Completely self contained with internal mains power supply. (Even a free mains plug is fitted!) A *TEST facility gives ON SCREEN indication that Le MODEM is working correctly.*
- ***FREE Registration to MicroLink.***

SALE OFFER £62 (carr £5)

(Price includes, Le Modem, Software ROM, Cables & Comprehensive Manual)
(Write in for further details)

APOLLO



The NEW Modem from Watford

Following numerous requests from you, our discerning customers for an APPROVED, Low Cost & High Performance modem with Auto Dial & Auto Answer facilities as standard) we bring you the versatile APOLLO Modem. Just compare the features and look at the price (which incidentally includes the cost of the Software, manual and BBC connecting cable). We are sure you will agree that Watford Electronics in their traditional way are giving you a super 'value for money' deal.

Just look at these features:

- V21 for Bulletin boards, Microlink, Telecom Gold, etc.
- V23 for Prestel, Home Banking, and other Viewdata services.
- Reverse V23 allows User run Viewdata service.
- 1200-1200 half duplex for communications.
- XMODEM, HEX and ASCII file transmission.
- Auto Dial of given 'phone number.
- Auto Answer for User's Bulletin Board.
- 80 column terminal with split screen facility.
- Prestel text screen dump.
- Fully BABT approved.
- **FREE Registration to MicroLink.**
- **£6.50 off annual Membership to Micronet, Prestel and Telecom Gold.**

Sale Offer: **£64** **(Carr £5)**
Price includes, the Modem, Comm Software Cables & Operating Manual).
(Write in for full specification)



Aries 1200 MODEM



If you thought £150 didn't buy much of a modem you haven't heard about the aries 1200

Up till now buying a modem was a compromise between price and performance, but the new Aries 1200 offers performance and features not found on modems costing two or three times as much. Look at the features offered by the Aries 1200, features which you wouldn't expect from a modem at this price – and some which you would be lucky to find on a modem at any price.

- Operates in V21 (300/300), V23 (1200/75 and 75/1200) and proprietary V23 1200 mode.
- Connect it to any type of computer or terminal via the 25 way serial D connector or the BBC standard 5 pin Domino socket.
- A built in phone socket means your phone plugs straight through.
- A reset switch so the hardware makes it easy to restart – even when your software doesn't.
- Industry standard Hayes (C) compatibility means that this is one of the easiest modems to use. It can automatically work out the speed your computer is working at, and even the speed and protocol of the modem at the other end.
- Auto Call mode can dial using tone or pulse (the modem works that out too), and when it connects it will automatically determine the speed of the answering modem.
- Auto answer mode means the modem can be left unattended to answer calls from other modems, and of course it automatically works out the speed and protocol of the calling modem.
- The built in speaker and front panel LED's mean that you always know what the modem is doing.

. . . Features at any price.

- Proprietary V23 mode mean that two Aries 1200's can communicate at 1200/1200 and in this situation you can take advantage of the built in data compaction which reduces the volume of text you send by 30%.
- Built in scrambler means that data transferred between two Aries modems is automatically encrypted. The encryption code can be user defined for a totally private email system.
- User defined control commands means that the Aries can even be used from a dumb terminal or with non standard software.
- Front panel light include indicators for Power, Auto Answer Mode, Transmit, Receive, On line, Terminal ready and Carrier Detect. There's even an indicator to show the quality of the phone line.
- Internal watch-dog monitors the modems activity and in the event of a power failure or computer crash it automatically resets the modem. The Aries modem can never hold open your phone line or lock up your computer.
- Built in printer port allows the Aries to direct incoming data directly to a printer, text can be tagged so that it is selectively sent either to the printer or the computer.
- All modem setting are stored in solid state non volatile memory – no battery to go flat and hang crash the system.

Launch Offer **Only: £149**

Hayes Compatible BBC Comms Software ROM & Manual **£25**

WATFORD CUT PRICES NOT PERFORMANCE

Continued



COMPUTER CONCEPT'S ROMS

ACCELERATOR	£30
CARETAKER Basic Utility	£23
DISC DOCTOR	£28
Graphics ROM	£29
TERMI	£25
COMMUNICATOR	£49
Printmaster	£24

Wordwise £26

Wordwise plus £40

We are giving away absolutely **FREE,** the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear text-segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc Interface in your Micro)

HI-WORDWISE-PLUS DISC: £5

SPELL MASTER £42

Inter SHEET ONLY £37



ONLY: £25

Inter-WORD £36

MEGA-3 ROM

Interword, Intersheet & Interchart – 3 in one ROM £76

INTERBASE £49

All Prices Exclusive of VAT

VIEW

VIEW WORDPROCESSOR 2.1	£35
VIEW 3.0 ROM	**£48**
VIEW PROFESSIONAL	**£59**
HI-VIEW (for 6502 2nd Processor)	£36
VIEWSHEET (Acornsoft)	£36
VIEWSTORE	£36
VIEWSPELL with 80 track disc	£29
VIEWPLOT Disc (Please specify for Master 128 or Compact)	£20
VIEW-INDEX	£12
OVERVIEW Packs 1 & 2	£69

Watford's own Sophisticated VIEW PRINTER DRIVERS

Epson FX80 & Kaga KP (Disc)	£8
Juki & Brother HR15 (Disc)	£8
Silver Reed Printers (Disc)	£8

BBC SOFTWARE'S Popular Educational Software

- Maths with a Story 1 (Disc). 4 primary level maths programs £11.25
- Maths with a Story 2 (Disc) 4 further maths programs £11.25
- Picture Craft (Disc) 6 - 14 age group. Pack consists of flexible geometrical design & colouring programs £17
- WAVES: Science Topics (Disc) CSC O Level Physics program. £14.95
- RELATIONSHIP: Science (Disc) O Level Biology program. £20.00
- BONDING: Science (Disc) O Level Chemistry program. £20.00
- ELECTROMAGNETIC SPECTRUM (8 Discs) O Level program. £20.00
- ELECTRONICS IN ACTION (Disc) O Level program £19.95
- NEWTON & THE SPACE SHUTTLE (Disc) O Level program. £20
- ECOLOGY (Disc) O Level program. £20
- POLYMERS (Disc) O Level program. £20
- Clasification & Periodic Table O Level. The suite is supplied with its own database of chemical elements which can be classified according to your own rule. £20
- FOOD & POPULATION (Disc) O Level program. £20
- MICROTECHNOLOGY (Cassette) O Level program. £11.25
- A VOUS LA FRANCE (2 Cassettes) A French language home study aid. £21.70
- DEUTSCH DIREKT! (Disc & Audio Cassette) £19.95
- Modem Master (Disc) £11.25
- ADVANCED TELETEXT SYSTEM £8.65
- PERIOD TABLE SOFTWARE £20
- Astronomy – Primary (Disc) £12
- Computers at Work – Primary £17.35
- Introducing Geography – Primary £17
- **Introducing Geography 11-17yrs £17.50**
- Electric Fields 6-14 years £11.25
- BlackQueen Contract Bridge £13
- Espana Viva – 3 Discs £19.95
- A Vous La France Disc £21.50

MINI OFFICE II

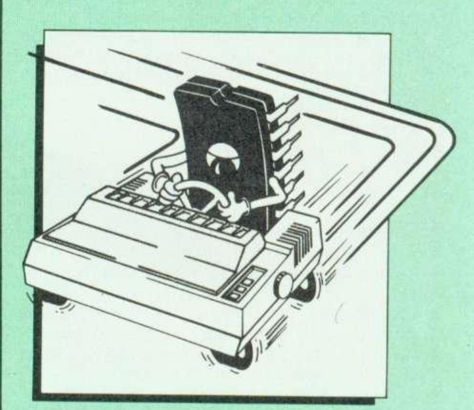
DISC Version for BBC B & B+	£14.00
DISC Version for BBC Master	£16.50
Disc Version for the Compact	£18.00

(When ordering please specify for which Micro & 40 or 80 track Disc).

Advanced Computer Products

Advanced Disc Toolkit	£30
Advanced Disc Investigator	£25
Advanced 1770 DFS BBC	£29
Advanced 1770 DFS Master	£30
Advanced File Manager	£25.00
Advanced Control Panel	£30.00

VIEW PRINTER DRIVER ROM



View is a powerful word processor, but until now has seriously lacked in terms of printer support. With the launch of our Printer Driver ROM, which includes an extremely powerful and easy to use Printer Driver Generator, View users can find themselves in the realms of advanced word processing only at a small outlay.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redefinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute * command when printing.

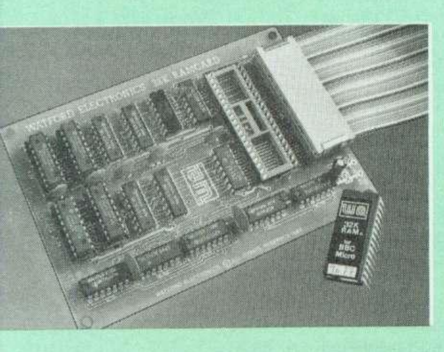
Other features include a very powerful on screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips. (Write in for a detailed leaflet).

Price: Only £33

32K

SHADOW RAM-Printer Buffer

Expansion Board



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16K or even 20K, but a massive 32K of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.

- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.

- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24K of text in memory. This product is recommended as an ideal complement by Computer Concepts.

- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20K of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28K of program space.

- Use the FULL 32K or the bottom 12K of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS423 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138,145,ADVAL etc). Please note only a 12K printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.

- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

- Recommended by Computer Concepts foi use with their Inter series of ROMs.

Only £59 (carr £2)

(Price includes a comprehensive manual and the ROM)

INCREDIBLE WORDPROCESSING DEAL

Watford's 32K SHADOW RAM CARD and Computer Concept's INTERWORD Wordprocessor package.

at Only **£89** (carr £2)

ROM MANAGER

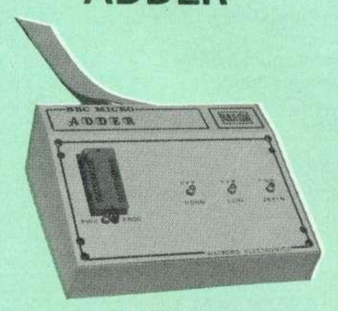


Take control of your Sideways ROMs with ROM Manager. This powerful utility ROM gives you power over your sideways ROMs. Disable whole ROMs, send commands directly to named ROMs and many other powerful facilities.

"Provides comprehensive management of all your installed ROMs". (BEEBUG November '84.)

ONLY £20

ADDER



The only low cost EPROM Programmer for the BBC Micro that will program both the standard 21V and the new 12V5, 27128 EPROMS.
Adder is the ultimate EPROM programmer for the BBC Micro. It will program many different EPROMs up to the very latest 27256 32K devices.
The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.
The Adder software provides sophisticated facilities for programming EPROMs from a RAM image produced by loading disc files. The software is menu driven and designed for ease of use.
Features:

- Two ultra fast programming algorithms or standard slow algorithm.
- Supports standard 21V programming and newer 12.5 volt EPROMs. (Software switched).
- The RAM image to be programmed can be built up in many ways. Sections of image can be loaded separately. Part programming. Read EPROM. Edit data in memory.
- Automatic processing to handle a list of files to program into the EPROM.
- Automatic disc buffering to allow programming of 32K 27256 devices from a 32K file without extra effort.
- Verification gives detailed error list and checksums are maintained. There is also a blank check facility.
- Works with all standard filing systems. Generates header code for RFS ROMs to allow Basic programs etc. to be stored in EPROM. More than one file per ROM permitted.
- Programs the following EPROMs: From 2K to 32K: 2516, 2716, 2532, 2732, 2764, 2764A, 27128, 27128A, 27256 (Both 12.5V and 21V).

£72 (£5 Carr)

TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast. We use these erasers for all our own erasing work.

- **ERASER EB** – Standard version erases up to 16 chips. **£28** (carr £2)
- **ERASER GT** – Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£30** (carr £2)
- Spare UV tubes. **£9**

OFFICE MASTER



CASHBOOK – A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trail balance.
FINAL ACCOUNTS – Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.
MAILIST – A very versatile program. Enables you to keep records of names and addresses and then print, examine, sort and find them, all with special selection techniques.
EASILEDGER – A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.
INVOICES & STATEMENTS – Greatly reduces the time and cost of preparing Invoices and Statements by storing essential information like customer names, addresses and account numbers. Has VAT routines and footer messages facility.
STOCK CONTROL – Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier detail.

All this for only **£21** (Disc)

OFFICE MATE



- DATABASE
- BEEBCALC SPREADSHEET
- BEEBPLOT GRAPHICS

DATABASE – Set up a computerised card index system with powerful search facilities.
SPREADSHEET – Offers many calculation and editing features.
BEEBPLOT – Provides visual representation from Spreadsheet data.

OFFICE MATE Only £10 (Disc)

Disc Drives DP35-800S



A Double disc drive – with a difference! Times are changing fast for the floppy disk, and whilst the current standard for the BBC B and Master Series is the 5.25 inch disk, the standard for the future will most certainly be the smaller; faster and more reliable 3.5 inch disks – now a standard feature of both the Master Compact and the Archimedes Series.

To support the present disc drive users, and cope with the future, we have designed our own plinth-mounted disk system – called the DP35 800S, it contains both the 5.25 inch and the 3.5 inch drive formats as well as offer a firm and rigid support for a monitor on top. With the BBC Micro underneath, the plinth makes a surprisingly small footprint on the desk – leaving you more space to work with.

The 5.25" disc drive is 40/80 track switchable. For ease of access, the switches are front mounted. DP35-800S has its own power supply, independent of the BBC Micro.

Watford's new plinth enables users to read, write and format disks both in DFS and ADFS format – currently the accepted standard for the Master Compact and the Archimedes, it also enables the user to read disks written for the Archimedes. Ideal for both BBC & Master.

Launch Offer: **£165** (carr. £7)

Continued


BOOKS (No VAT on Books)

15 Hr Wordprocessing BBC/View	£5.95
15 Hr Wordprocessing BBC/WW & WW+	£5.95
30 Hour BASIC (BBC Micro)	£12.95
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6502 Application	£13.95
6502 Development Package	£7.50
6502 Programming the	£16.95
6502 Reference Guide	£10.95
68000 Assembly Language	£15.95
68000 Assembly Language Prog.	£10.95
68000 Assembly Language Techniques	£24.95
68000 Machine Code Programming	£13.00
68000 Microprocessor Handbook	£14.95
68000 Programming the	£22.95
68000 User Guide	£8.95
6809, Programming the	£18.95
Advanced Disc User Guide	£18.95
Advanced Prog. Guide to BBC	£9.95
Adv. Sideways RAM User Guide	£9.95
Advanced User Guide for BBC	£10.95
Amiga Hardware Ref Manual	£23.70
Amiga Machine Lang. Guide	£19.95
ARM Assembly Lang. Prog. Manua £12	
Art of Microcomputer Graphics	£16.95
Assembly Language Prog. for the BBC	£9.95
AY-3-8910 Programmable Sound Generator Data Manual	£3
BASIC 2 – User Guide	£2
BBC – Advanced Graphics with the	£11.75
BBC – Advanced Programming Techniques for	£8.95
BBC – Mastering Assembly Code	£8.95
BBC Micro & the small Business	£5.75
BBC Micro Basic Sound & Graphics	£7.95
BBC Micro – File Handling On	£8.50
BBC Micro Programs in BASIC	£5.95
BBC Micro ROM Book	£10.95
BBC Micro – within the	£13.95
BBC Master 128 for High Flyer	£10.95
BCPL User Guide	£14
BCPL The Language & its Compiler	£8.50
C Big Red Book of	£7.50
C - A Dabhand Guide to	£14.95
'C' Introducing	£9.95
C for Programmers	£9.95
C Programming Lang.	£23.95
COMAL – Introduction to	£9.50
Complete FORTH	£6.95
Computer Graphics & CAD fundamentals	£9.95
Deutsch Direkti (Book only)	£5.95
DNFS Instruction Booklet	£2
Disc Drive Projects for Micros	£6.50
DISC FILING SYSTEM (DFS) Operating Manual for BBC	£6.95
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Introduction to FORTH	£8.95
Introduction to LOGO	£6.95
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Inside Information, Computers & Coms.	£9.95
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LISP Looking At	£11.95
LISP the Language of Artificial Intelligence	£13.95
Logo on the BBC Micro	£7.50
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Mastering Assembly Code	£8.95
Mastering CP-M	£17.95
Mastering Interpreters & Compilers	£14.95
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Viewsheet & Viewstore Dabhand Guide	£12.95
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VIEW Dabhand Guide	£12.95
Viewsheet User Guide	£10
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Z80 Applications	£15.95
Z80 Assembly Language Prog.	£20.95
Z80 Programming the	£19.95
Z88 Computing	£9.95
Z88 Using Your	£9.95

Carriage on Books vary between £1 to £3.50, depending on their weight.

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1-2-3 For Business 2nd Edition	£20.95
1-2-3 Command Language	£19.95
1-2-3 Special Edition (QUE) – Using	£21.95
8086/8088 Assembly Language Prog.	£12.45
8086/8088 Programming the	£17.95
Ability – Using	£12.95
Accountancy software in Business – Using	£12.95
Advance C Tech & Application	£19.95
Advanced Tech. in Turbo Pascal	£19.95
Aldus Pagemaker – Using	£21.45
Amstrad Basic 2 Manuals	£12.95
Amstrad Technical Manuals (Please specify 1512 or 1640 when ordering)	£19.95
Amstrad PC Programmers Ref Guide	£7.50
Amstrad PC1512-1640 Step by Step – Using	£8.50
Autocad – Using Release 10	£26.95
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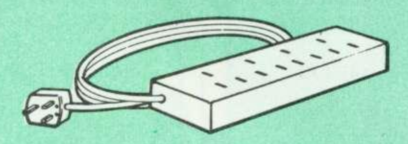
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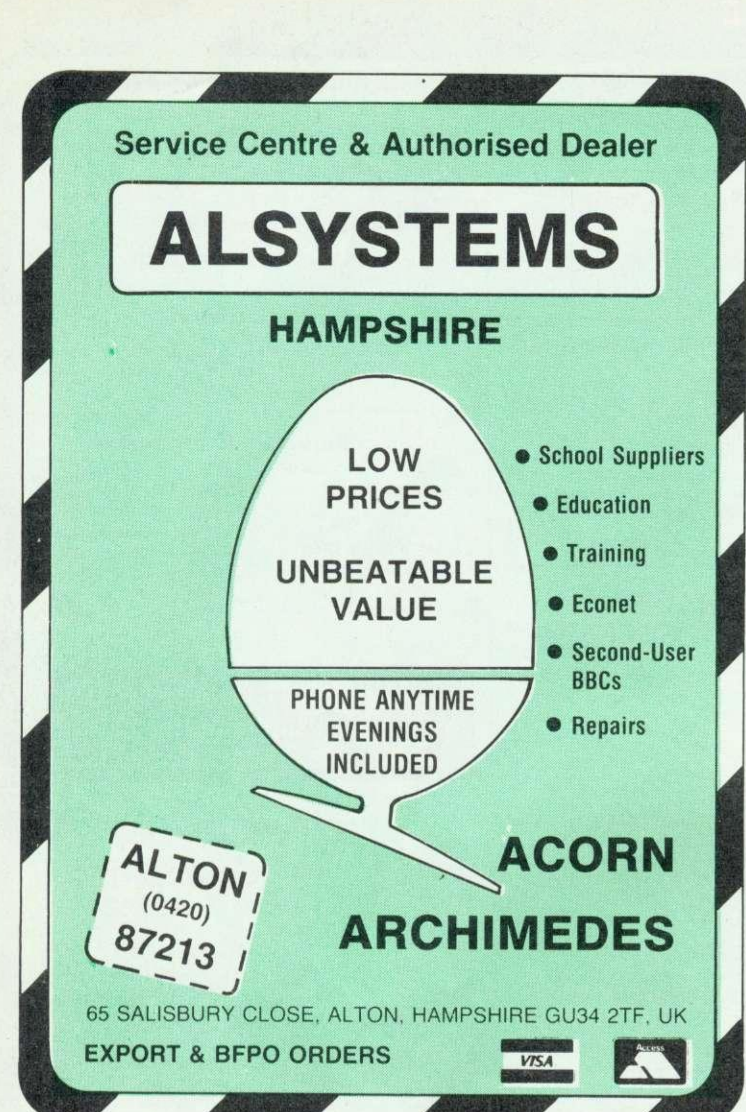
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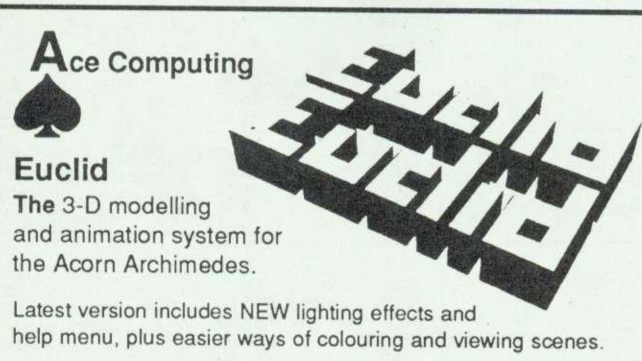
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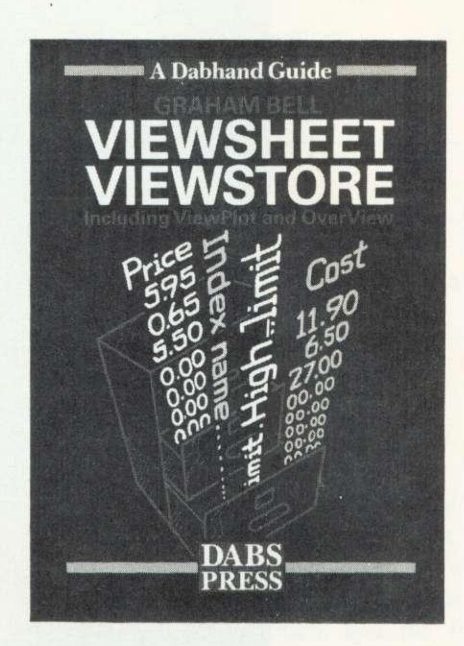
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GET TO THE POINT

Take the pain out of decimals and fractions by adding floating point instructions to your ARM machine code programs

Tim Chappell

Like the human mind, computers prefer to deal with whole numbers rather than decimals and fractions. But where you are able to use a calculator, the Archimedes' machine code programmer has no easy way of using floating point arithmetic.

Acorn designed the Archimedes with the intention that a special chip called a floating point co-processor could be added, to take the strain off both the ARM chip and programmers alike. Acorn also provides a relocatable module, to emulate the co-processor, if it is not fitted in the computer. The file is provided on the Welcome disc, along with the RAM version of Basic, in a directory labelled 'Modules' – or in '!System.Modules' on the Risc OS disc. To install the emulator, make sure that there's enough RMA space – 32k should be sufficient – and then *Rmrun the file. So you could type *Rmrun $.!System.Modules.FPEmulator.

The emulator is designed so that it emulates the co-processor exactly, and so a program that runs on the emulator will also run on a machine fitted with the co-processor, albeit a lot faster.

ILLUSTRATION BY JONATHAN INGLIS

The floating point co-processor can be best seen as a 'cut-down' ARM processor – with fewer commands and only eight registers instead of 16. They are referred to as F0 to F7. There are other similarities, in that each arithmetic command refers to the registers, not to memory, and numbers must be loaded into the registers before they can be used.

The floating-point system can only be used from assembly language, and Basic 5 doesn't allow you to assemble the necessary floating-point instructions. Our program on the monthly disc lets you add the new instructions to your ARM machine code programs more easily.

Most calculations involving whole numbers, ie, integers, can be worked out exactly: three times five is exactly 15. The answer is still a whole number. But with real numbers, 3.1 times 5.1 needs two decimal places in the answer – more than there are in the original numbers. So you sometimes run out of decimal places, and you need to round the answer. The floating point system provides two controls over this. First, numbers are stored and treated with one of four precisions – different numbers of decimal places. And the rounding is controllable, either to the nearest number, upwards, downwards or towards zero. Table 1 shows the four possibilities. In fact, whenever the co-processor carries out a calculation, the result is effectively calculated to an infinite precision. It's only the answer that is rounded and placed in the required register. If a floating point number is loaded or stored in memory, it is stored in a format which is determined by the precision parameter (see table 2).

The commands which the co-processor uses can be split into six types. Co-processor Data Transfer instructions allow you to transfer data held in floating point registers to or from main memory. The number of bytes required to store a floating point number in memory depends upon the precision under which the value is stored. If a floating point number is stored in extended precision format, then no accuracy will be lost during transfer to or from memory. The general format of these instructions is:

OPC <condition> precision Fd,address

where OPC is the operation mnemonic. This can be either LDF (load from memory) or STF (store in memory). The condition is one of the normal ARM conditions (AL,CS,NV and so on) and these refer to the ARM processor, not to any numbers in the floating point unit. The precision is the single character precision code from table 1.

Rounding mode	Parameter letter	Effect
Nearest	(space)	Rounds to nearest number
Plus	P	Rounds upwards
Minus	M	Rounds downwards
Zero	Z	Rounds towards zero

Table 1. Four possible ways of rounding parameters

Precision	Parameter	Bytes
Single	S	4
Double	D	8
Extended	E	12
Packed BCD	P	12

Table 2. Precision parameter

a) Invalid Operation (IVO)
This occurs if any of the following are attempted:
- any operation after an error
- 0 / 0
- infinity / infinity
- infinity - infinity
- infinity * 0
- SQT of any negative number
- FIX or FLT of infinity
- ACS(x) or ASN(x) where x > 1
- SINS(x),COS(x),TAN(x) if x in infinite
- LOG(x) or LGN(x) where x <= 0
- RMF where result is infinite

b) Divide By Zero (DVZ)

c) Overflow (OFL)
If the answer to a calculation is larger than the largest possible number.

d) Underflow (UFL)
If the answer is smaller than the smallest possible number.

e) Inexact (INX)
Inexact numbers are where a trigonometric calculation returns an answer that may be wrong.

The Floating Point Status Register bit allocation:

20	19	18	17	16	4	3	2	1	0
I	U	O	D	I	I	U	O	D	I
N	F	F	V	V	N	F	F	V	V
X	L	L	Z	O	X	L	L	Z	O
interrupt bits					error flags				

Table 3. Possible errors

Fd is the floating point register in question, and the address is the normal ARM memory address. This address can itself be in an ARM register, and can be offset if necessary. So you could use:

(Rn,#offset!)

as the address. Rn is the ARM register containing a memory address. The offset is added to it, then the floating point number is stored there. The final ! means that the final address used (including the offset) is written back to Rn.

A more straightforward use of the store instruction would be:

```
ADR     R0, store
STFALE F3, (R0).store
EQUD 0
EQUD 0
EQUD 0
```

This points the ARM register zero to a storage area in memory, then stores the floating point number in F3 in the memory pointed to by R0. The AL is the Always condition, and the E specifies double extended precision.

The second group are co-processor register transfer instructions. The two instructions in this group allow transfer of register contents between the ARM chip and the co-processor. The FLT instruction transfers a value in a specified ARM register to a floating point register, and is of the format:

FLT <cond> precision <round> Fd, Rn

Here the precision must be specified, and rounded too if you don't want the default 'round to nearest' method. Fd is the floating point register to place the number in – it is taken from ARM register Rn.

The opposite instruction is FIX. This converts a floating point number into an integer and puts it in an ARM register:

FIX <cond> precision <round> Rn,Fd

So 'FLTALE F3,R4' is the equivalent of F3=R4, and the final number is stored in F3 in extended precision. 'FIXALEZ R6,F7 is like R6=INT(F7). Note that FIX will return zero if the floating point value is between zero and one, or if it's between zero and -1, as the rounding is set to round towards zero.

The third group are co-processor status register transfer instructions. These two commands allow you access to the status register contained within the co-processor. This is used to keep track of any errors that occur during calculations. Several error states can occur – resulting in bits of the status register being set and execution halting. Table 3 lists all the

possible error conditions. The two commands are RFS and WFS. They are used to read and write the status. They are like the FLT and FIX operations, except they require only an ARM register to put the status word into.

Normally, if an error occurs, it halts your program. The commands may be used to control the effect of errors, or to clear error conditions when they occur. To clear the error, you just write a zero into the status bit. To prevent an error halting your program, you can write zero to the relevant interrupt bit of the status register. You can do either by transferring the status register to an ARM register using RFS, clearing the required bit (leaving the others untouched) and returning the status using WFS.

The fourth group of floating-point operations are unary data operations. The instructions in this group provide a simple way of getting cosines, logarithms and square roots in ARM machine code. They are listed in table 4, and they all have the following format:

OPC<cond>precision<round>Fd,Fm

Fd is the destination register, and Fm is the source register. Fm can also be an immediate operand – which relates to a constant. But there are only eight possible constants, listed in table 4. So MVFALE F0,#6 is equivalent to F0=0.5.

The fifth group of instructions are very similar, but are binary data operations – those that work on two numbers, like subtract, divide and power. Each is like group four, except two floating-point source registers have to be specified:

OPC<cond>precision<round>
Fd,Fn,Fm

As before, Fm may be an immediate operand, but Fn can't.

Comparisons are made with the last group of four instructions. These are the co-processor status transfer instructions CMF, CNF, CMFE and CNFE. They allow you to compare two floating point numbers, and set the normal ARM status registers so you can use conditional instructions or make a branch afterwards.

OPC<cond>precision<round>Fn,Fm

The difference between CMF and CNF is that CMF compares Fn and Fm, whereas CNF compares Fn and -Fm. Fm can be an immediate constant, (see table 5).

There are two types of comparison. The first is known as 'unexcepted'.

Opcode	Process
ABS	Fd=ABS (Fm)
ACS	Fd=ACS (Fm)
ASN	Fd=ASN (Fm)
ATN	Fd=ATN (Fm)
COS	Fd=COS (Fm)
EXP	Fd=EXP (Fm)
LGN	Fd=LN (Fm)
LOG	Fd=LOG (Fm)
MNF	Fd=Fm
MVF	Fd=Fm
RND	Fd=INT (Fm)
SIN	Fd=SIN (Fm)
SQT	Fd=SQR (Fm)
TAN	Fd=TAN (Fm)

Table 4. Unary data operations

Fm constant	Real value
0	0
1	1
2	2
3	3
4	4
5	5
6	0.5
7	10

Table 5. Immediate constants

Opcode	Process
ADF	Fd=Fn+Fm
DVF	Fd=Fn / Fm
FDV	Fd=Fn / Fm (fast)
FML	Fd=Fn * Fm (fast)
FRD	Fd=Fm / Fn (fast)
MUF	Fd=Fn * Fm
POW	Fd=Fn ∧ Fm
POL	Fd=polar angle of Fn, Fm
RDF	Fd=Fm / Fn
RMF	Fd=Fn MOD Fm
RPW	Fd=Fm ∧ Fn
RSF	Fd=Fm–Fn
SUF	Fd=Fn–Fm

fast multiply and divide instructions are only single precision.

Table 6. Binary data operation

Comparisons using CMF and CNF are used if instructions following the comparison depend on the equality of the two numbers – for example if BNE or BEQ are used afterwards. This comparison will also detect whether the registers are 'unordered' (ie, when one is not a number, as happens when it is the result of an operation that caused an error). 'Excepted' comparisons, using CMFE and CNFE, are used the rest of the time.

After a comparison, the ARM status flags are set to reflect the situation. N is set if Fn<Fm or Fn<-Fm, and Z is set if Fn=Fm. C is set if Fn>=Fm or Fn>=-Fm. V is set if the registers are unordered.

The Basic assembler doesn't allow you to include any of these new instructions in a program. The only way to incorporate them is to calculate the value that represents the required command and enter it into the assembler in an EQUD statement. For example:

STFALE F3,(R4,#-3)

has the value &ED443103. This could be included in assembler text using:

EQUD &ED443103

The problem with this is the time taken to calculate the required value by hand, since each command is very complex and requires several parameters.

One solution is to write a routine that converts commands in their text form into the value which represents them in memory. The floating point encoder on the monthly disc does just that. It consists of two programs – both should be saved in your Library directory. If you do not have a library on your disc, create one using the command:

*CDIR $.LIBRARY

You can then inform the computer that this is to be the Library directory by issuing the command:

*LIB $.LIBRARY

Program 1 creates a datafile which will be used whenever the encoder (program 2) starts up. Although it would be best to have all the data in the main program, this isn't possible since Basic Restore commands cannot be used within Basic procedure libraries.

It is only necessary to run program 1 once to create the datafile. The main program is designed to be used as a library procedure, and may be used as an extension to your own programs in one of three ways. You could add the program on to the end of your own once and for all, with the Append command. Or you could install it temporarily when you run your program, using the Library command. However, the best way to do it is to Install it as a procedure library which stays in memory until you leave Basic. This is very useful – when you list your program, the encoder isn't visible, but it can all be used all the time. LVAR will give details of help available from the encoder routines.

The Install, Library and Append

functions all need the filename to be enclosed in quotes, for example:

INSTALL "%.FPEncoder"

The percent sign signifies the current library directory in the same way that $ represents the root directory. The encoder provides a procedure to determine if the floating point emulator is resident in the relocatable module area. If the emulator isn't there, an error occurs, number 258. So the following lines determine if the floating point emulator is present, and if not, attempt to load it:

```
10 ON ERROR IF ERR<>258 THEN
REPORT:PRINT " at line ";ERL:END
ELSE *RMRUN <path>
20 PROCcheck_inst
```

In line 10, <path> is the filename of the emulator ($.Modules.FPEmulator or $.!System.Modules.FPEmulator).

The main procedure through which all the encoding facilities are called is FNencode(""). This returns the value that represents the instruction. So the instruction may be assembled using:

```
EQUD FNencode("STFALE F0,(R0),#3)
```

The encoder tries to encode any string passed to it, and will report any parts that it cannot assemble. It does however expect certain rules to be followed. All opcodes, condition codes, precision and rounding parameters must be passed as upper-case characters.

Condition codes are obligatory. This means that if the instruction is always to be executed, 'AL must be included as the condition code: the normal Basic ARM assembler allows you to omit AL.

If the instruction requires precision or rounding parameters, they must be specified too. Registers may be preceded by their type, ie, R for ARM registers and F for floating point registers. Registers, offsets and constants may be replaced by Basic variables which will be evaluated using EVAL. Finally, the CMFE and CNFE instructions have been shortened to CME and CNE respectively.

The above presents you with sufficient detail to start programming the floating point co-processor. However, the hints in the box may help ease the process. This month's 3.5-inch monthly disc also contains an example program using the new floating point instructions, showing you how they are used.

HINTS FOR USING THE EMULATOR

■ Use labels to signify the use of each register, and plan their allocation to reduce unnecessary transfer to data between registers.

■ If an error does occur during assembly, and you are unsure as to which instruction caused the error type:

PRINT original$

This will reveal the last line passed to the encoder.

■ Detailed help is available from the encoder. For further details type LVAR when the encoder is installed. *MEMORYI provides full disassembly of floating point instructions, although it doesn't show the AL condition.

■ If the error 'Undefined Instruction at &xxxxxxxx' occurs when attempting to execute machine code containing floating point instructions, then it's possible the floating point emulator isn't present.

Due to the length of the Druid game in this issue, the Floating Point programs are only available on the monthly disc. You can get a photocopy if you send an SAE to BBC Acorn User *(address on the contents page).*

TALES TO TELL

A multi-cultural society needs multi-cultural technology, and Diwali makes a practical focus for study

Chris Drage and Nick Evans

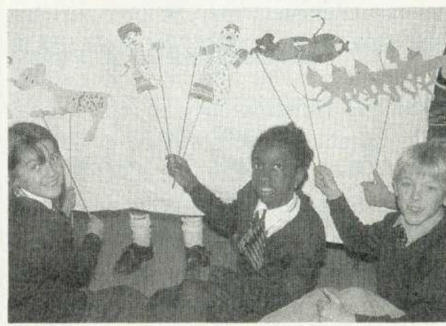
In the multi-cultural society of today, it becomes increasingly important to include aspects of one another's respective cultures in the school curriculum. However, resources to support such work are frequently limited to the traditional materials – books, transparencies, charts, and so on, but they seldom appear in the form of computer software.

However, the situation is slowly changing and two packages are now available which can be used to develop an appreciation of the Asian Festival Of Lights, Diwali.

Although Diwali originates in India, it is celebrated all over the world wherever a population from the subcontinent has settled. In Britain it is not surprising that Diwali represents a major event in the calendar of many ethnic minority groups. During October 1988 a class of 10-year-old west London schoolchildren had been studying the religions represented in the local community. By the end of the month they prepared to study Hinduism and Sikhism and because Diwali was imminent, this became a focus for the study.

The teacher used the BBC School's Broadcast programme *Watch* to form the basis of the work. During the latter part of 1988 the theme for the series was the Ramayana (the epic story on which Diwali is based). *Ramayana Tales* from BBC Soft is a dedicated version of a simple program designed to introduce junior-aged children to rudimentary desktop publishing. It is specifically designed to support the *Watch* broadcasts.

In addition to *Ramayana Tales*, the teacher wished to continue to develop the children's wordprocessing ability with Logotron's *Pendown*. The topic also provided an excellent opportunity for ethnic minority children (mainly Sikh) to write in their community language; thus *Asian Folio* (Tedimen's Punjabi version) was added to the arsenal of resources.



Shadow puppets were made . . .



. . . to act out the Ramayana epic

Ramayana Tales closely follows the format of Resource's *Tales* series of programs, the only difference being the respective picture libraries reflecting the theme of each program. Pictures from the disc-based library are combined with text and special graphic characters to form pages of an electronic 'book'.

Each book contains up to 40 'pages' – a page being a screen full of text, pictures and graphic characters. The package is menu driven, offering children the choice of reading and editing pages or viewing the picture library.

The book can be opened at any page, then scanned through sequentially. Pages may be sent to an Epson-compatible printer which provides children with hard copy of their work. Although there's a choice of positive or negative dumps, no half-sized dumps are possible. There is also no provision for colour dumps using the popular Integrex 132 Colourjet. This is a shame as a finished book printed in colour is really satisfying for children. *Snatch* from 4Mation provides both variable sized and Integrex colour dumps, but at an extra cost.

Pages may be composed from the main menu. Text is entered in double height and in 11 colours (four of which are flashing). The library contains 77 pictures on disc which can be used to illustrate pages. These are called up, moved over the screen and placed in position. Moving or deleting a picture is possible at any time during page composition.

A set of graphic character blocks is available from the keyboard and these can be combined to depict walls, trees, caves, title letters – in fact almost any shape. A very clever refresh key enables any graphic to be superimposed on another and to partially obscure it. Thus characters and animals can be made to look over objects, or 'stand' behind others. Unfortunately, no picture editor is provided. Many children who have used Resource's *Tales* have frequently asked if they might create their own pictures and are disappointed that this feature was not included.

Folio from Tedimen Software has enjoyed particular success in thousands of schools throughout the country. Perhaps this can be attributed to the fact that it is a totally child-centred wordprocessor, which at first deliberately provides only a limited range of facilities, enabling even the youngest students to get to grips with wordprocessing quickly and confidently. The teacher can introduce new features as and when he or she believes it is appropriate.

Folio is well safety-netted and every operation is logical, simple and can be undone. All screens are easy to read and the text is always preserved no matter how many times the Break key is inadvertently pressed! The range of compatible settings which configures the

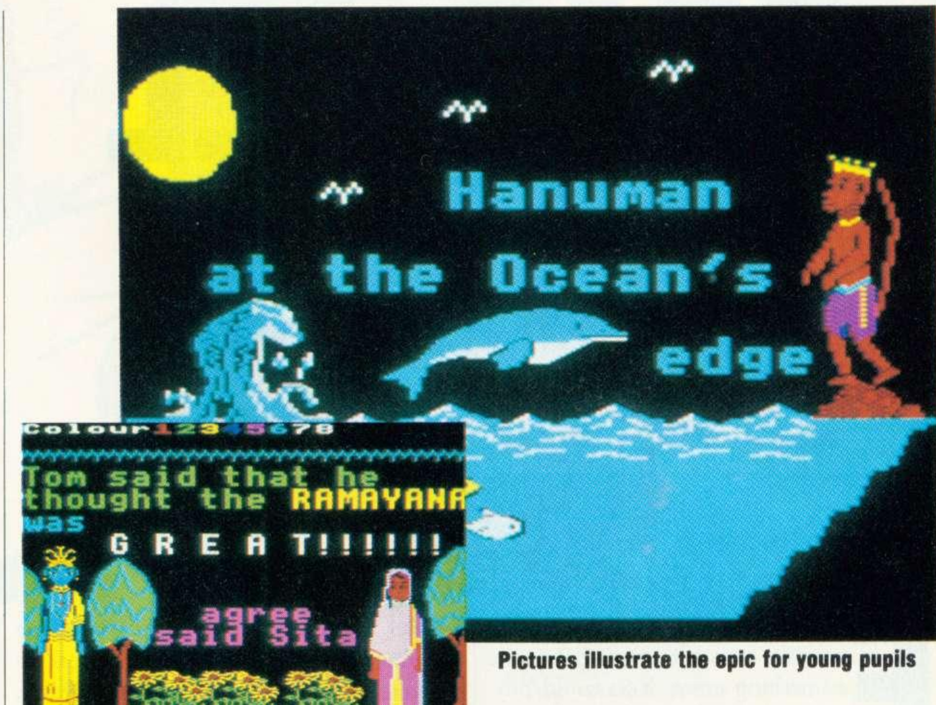
system to suit children's individual needs may be saved to the child's file thus preserving the settings for each person. They can pick up exactly where they left off. Concept keyboard overlay files can be created to allow single key input of words, phrases or commands. The print option allows for large, medium and small printed text and varying sizes of stationery can be used. The attractive, on-screen text is reproduced authentically on paper – proportionally spaced for legibility. A full review of *Folio* appeared in *Acorn User* in October 1986 but since then the software has been updated.

Asian Folio is based on *Advanced Folio*, the latest version of the wordprocessor. Tedimen Software has obviously listened to teachers and responded by producing a version which is enhanced in several areas: there are now several different typefaces provided, in four sizes of print and in variable density. Print-out can be in single or multiple columns and batch printing is now possible under computer control. On the Master series machines document size can be up to 2000 words, with both DFS and ADFS being catered for. Despite the improvements, *Folio* maintains its simplified, child-centred approach. Asian versions are available for Bengali, Gujarati, Hindi and Punjabi. These utilise *Folio*'s English menu system but enable the complex non-European scripts to be manipulated on screen.

The problem of key assignments is neatly overcome by the use of clear plastic keyboard overlays – different ones for the BBC B and Master series and the use of adhesive key labels. Blank adhesive sheets are also included to cater for those who may wish to alter the key assignments. A full-feature character editor is included in the software to enable the letter shapes to be redefined and the spacing and key assignments of the typeface to be altered. *Folio*'s full Wysiwyg approach is maintained, with the new fonts and accents very clearly shown on screen.

The topic of Diwali was introduced to the children by using the *Watch* broadcast as mentioned above. From a subsequent discussion the class decided to produce a play based on the main elements and characters in the Ramayana. In addition the teacher planned visits to a local Hindu temple and a Sikh gudwara to provide direct insight for the children.

Several children set about producing a script for the play using *Pendown*, the class's standard wordprocessing tool. Paintings and drawings of each of the main characters were produced for a wall display. Individual children wrote descriptions of the characters, using the Punjabi version of *Folio*, to accompany the pictures. English translations were also added to produce bi-lingual captions. Various children with Sikh backgrounds responded to the interest generated by the use of Punjabi *Folio* to write their own versions of the Ramayana.



Scenes can be assembled from libraries

Pictures illustrate the epic for young pupils

For the play, the class couldn't decide between using shadow puppets and acting the parts themselves, so a compromise was reached. The shadow puppets would form the central core of the performance with other children adding dance, music and dramatisation of certain scenes themselves. The puppets were made from cardboard and pea sticks and a plain white sheet provided a screen, with a slide projector providing a source of strong backlighting. While all the preparations were in progress, groups of children wrote illustrated stories with *Ramayana Tales*. These were printed out, coloured in and assembled into books to accompany the play, so that younger children in the school could share the experience. It was evident that children using *Ramayana Tales* became quite excited about the package. The play was presented to the assembled school and, needless to say, was an enormous success.

Children from Asian backgrounds felt a heightened sense of pride and acceptance throughout the project. For the other children, the topic generated a better appreciation of a cultural heritage that few had experienced before. The Festival of Lights certainly took on a more significant meaning for the school.

For teachers contemplating work on this theme, both *Ramayana Tales* and *Asian Folio* will prove to be valuable resources. The former program has rather a narrow application, but will be of use every year at the time of Diwali. *Asian Folio* is another matter; its use is not restricted by content but can be used whenever the teacher sees value in the children expressing themselves in their particular community language. Multilingual versions of *Folio* offer an exciting new aspect to wordprocessing in school, providing community language teachers with a unique tool. We could certainly do with more software resources covering multi-ethnic themes. As this case study shows, their presence demonstrates that information technology can play an important role in education, even when the subject matter does not obviously suggest it.

Ramayana Tales *is available from BBC Soft, PO Box 22, Wellingborough NN8 2RE for the BBC B, B+ and Master 128. Price: £14.95 + £1.30 p&p.* Asian Folio *is available from Tedimen Software, PO Box 23, Southampton SO9 7BD for the BBC B, B+, Master 128 and Compact. Price: £30 + VAT (additional languages £10). LEA discounts are available.*

READ ALL ABOUT IT



It's amazing what you can do with a wordprocessor and your micro – read on to see how you can make the word move

Joe Telford

Every now and again, we all need a few lines of coding to do something extra. You could buy a program, but often the one you want just doesn't exist. Or it might be too expensive or just too sophisticated. However, BBC Acorn users have a wealth of facilities readily available in the Master or in ROM chip add-ons for the older BBC micro. And these can very often go at least half-way to solving any new problem.

Probably the most impressive of all ROMs are the wordprocessors, and these chips are highly under-rated. Not only are they able to provide us with the tools of the writing trade, but with a little lateral thinking, they can also offer a goldmine of extensions.

Anything typed into a wordprocessor, in addition to being just the text of a document, can also be regarded as part of a database. The size of this database is limited only by the amount of text which you can get into memory. Try for example typing a few lines from *The Tempest* into *View* or *Wordwise*. Now go to the start of the text and use your wordprocessor's Find function to look for 'Caliban'. You'll immediately find his first lines, with the benefit that they are in context – the cues and replies are there too. Repeated use of Find Next or Next Match will take you through all his lines.

More complex searches can provide you with insights of the various types of metaphor in common use, or other forms of imagery used in the play.

Not only can you handle prose in this way, but information can be added to a database in a 'free format'. It is useful to define our own perception of free format. A logical way of putting database information into a wordprocessor is to allocate one line of text per field. This is normally either 40 or 80 characters on a BBC micro, and the use of the Return key at the end of a line gives a clear visual layout for each record or collection of order to make the end result more useful for searching fields. Although browsing with the cursor keys might be adequate you should separate each record. If you start a new record with a special character, then by using the Next Match function you can step between records one at a time. A simple address database might look like this:

```
137 Records
@001
Tony Quinn
BBC Acorn User
Brunswick Place
LONDON
@002
Dave atherton
etc........
```

Of course very complex searches, database manipulation, reporting and special printing effects need to be performed outside the wordprocessor. This requires access to a range of utilities and it's fairly easy to write your own. Think for a moment about the way the text is stored on disc. It's one long file with text in it, and also it usually contains some control codes. In a wordprocessor database system where the fields are simple text, separated by Return characters, the control codes are minimal. The only thing you really need to be able to do is to read a line of text from the disc file containing the database. Let's imagine that you want to read record 23. This can be done with a set of procedures which might be structured like the example in figure 1.

```
   DEF PROCread(file$,re
cno,fields)
   ch%=OPENUP(file$)
   IF ch%=0 THEN PRINT "
No file":ENDPROC
   records=VAL(FNreadlin
e)
   IF recno>records THEN
PRINT "Rec too high":END
PROC
   FOR record=1 TO recno
   PROCreadrec(fields)
   NEXT
   CLOSE# ch%
   ENDPROC
   :
   DEF FNreadline
   LOCAL A$,B%:A$=""
   REPEAT:B%=BGET# ch%
   IF B%>31 AND B%<127
THEN A$=A$+CHR$(B%)
   UNTIL B%=13 OR EOF#
ch%
   =A$
   :
   DEF PROCreadrec(f)
   FOR field=0 TO fields
   F$(field)=FNreadline
   NEXT
   ENDPROC
```

Figure 1. Reading text from the database

If you decide to explore these procedures then make sure that you dimension an array f$(), large enough for the application you have in mind. If each record has say, six fields, then use DIM f$(7). Also remember that the @001 notation that separates each record is a field in its own right, so please make sure that you include it in your parameters when you call PROCread. The example in figure 1 counts it as field zero.

If you don't know the numbers of

ILLUSTRATION BY CLIVE GOODYER



fields in a record then the simplest way to find out is to load the file back into your wordprocessor and count the lines between the @ characters. For the odd occasion where you might be working with a number of files, and that might not be feasible, then another simple routine can be added to your file access library – FN fields is shown in figure 2.

```
DEF FNfields(file$)
ch%=OPENUP(file$)
recs=VAL(FNreadline)
dummy$=FNreadline
fields=0
REPEAT:fields=fields+
1
dummy$=FNreadline
UNTIL LEFT$(dummy$,1)
="@"
CLOSE# ch%
=fields
```

Figure 2. FN fields counts fields in a record

All in all then, it is quite simple to access a wordprocessor file as a database, and readers are encouraged to explore this exciting medium. But what about using a wordprocessor file for real text handling?

A teleprompt machine

Let's take the problem of scripting for a TV presentation, where a presenter has to talk for a lengthy period of time to the audience. This is a classic case for the wordprocessor. Primarily its use is going to be getting the speech or script together, but wouldn't it be useful if the script could also be used with a few amendments for the presenter to talk from? The days of notes on the table are long gone, and even in a 40-character mode the legibility of the wordprocessor display is questionable over distances beyond a few feet. This then means situating the monitor too close for comfort. The solution would obviously be to design a scrolling autocue system, where the character size is large enough to make out words easily over longer distances.

One of the benefits of the BBC micro's screen mode 7 is that double-height characters are easily created. If we can fix the text from the wordprocessor onto the screen in double-height characters, and scroll through the text at an easy (and adjustable) speaking rate, then we are well on the way to meeting the need for a simple teleprompt machine.

With all these simple hybrid applications you have to think at two levels. The first is 'how closely can I set my wordprocessor to match the needs of the final product?'. The second is 'how can the Basic utility use the wordprocessor file to best advantage?'

In the case of the wordprocessing requirements for the teleprompt program you simply need a wordprocessor which will let us use a 40-character screen, in fact about 37 or so characters per line, and which will save the file either as Ascii (pure text) or with Return characters after the last character on each line. I tend to use *View*, because it is relatively simple to handle, and it is available on many BBC model Bs and all Masters.

```
*BUILD !VIDEO
   0001 *BASIC
   0002 MODE 6
   0003 VDU 19,0,4;0;
   0004 *WORD
   0005 SET FI
   0006 NEW
   0007 *.
   0008 LOAD
ESCAPE
```

Figure 3. Setting up your working environment

You could start to set up your working environment like the example shown in Figure 3. The !Video boot file sets up the screen and enters *View* automatically.

The last line of the boot file ends with a space, and then the Escape key is pressed without pressing Return. Now typing *Exec!Video will set up the environment for teleprompt scripting using the *View* chip in your micro. Not only will you get a pretty blue and black striped screen, but the disc's contents will be shown and the word Load will be typed ready for you to add the name of the file needed for editing. Once editing is complete, the Save command will make sure that the document is put back on the disc in its amended format. Now you can progress to the Basic element of our hybrid, a teleprompt program.

The program

A very simple program could be written using our library routines. It would have to say something like this:

```
INPUT "Program name";n$
ch%=OPENUP n$
REPEAT
A$=FNreadline
PRINT CHR$(141);A$
PRINT CHR$(141);A$
UNTIL EOF# ch%
CLOSE# ch%
```

but this would need some modifying to suit your individual needs. The first program in the yellow pages is quite short, but it handles the teleprompt facility better than the outline above. Type it in and save it as B.SPOOL, on a disc of its own along with !Video,

because it will use a range of files which may as well live on the disc with the program. To run the program, type CHAIN "B.SPOOL" from Basic, or create an Exec file for use from *View*. The exec file is created as follows:

```
*BUILD !SPOOL
    0001 *BASIC
    0002 MODE 7:CH."B.SPOOL"
    0003
ESCAPE
```

Now the Basic program can be activated from any language or wordprocessor with *Exec !Spool. It's worth noting that with the Master, or a Beeb with a Watford DFS, then files created with *Build can be automatically executed with a *Name command like *!Video or *!Spool. This is because the *Build command sets the execution address of the file to &FFFFFFFF, and any file with that address is automatically executed rather than run.

Once the program is running, press Space to move past the title page and enter the name of the file you want to use. The next thing to enter is the time delay between lines. This is in seconds, and will depend on your reading speed. I use a value between 1 and 1.5 seconds per line and this seems satisfactory. Once the last number is entered and the Return key pressed, the screen clears, and a sequence of red, amber, and green strips appears at short intervals, and then the script appears line by line at a speed that allows easy reading.

When the script is complete, a green banner appears and the program can be rerun with the Return key. The file can easily be edited, because the Escape key causes the program to end, and the !Video exec file is used to start up *View*. Once *View* is operational, the file last used is reloaded for further editing. This is done by putting the commands needed in the keyboard input buffer with a *Key command followed by a *FX138 command.

Other facilities

The teleprompt hybrid could be useful for presentations, lectures or even in amateur video work, but could, with a little lateral thinking, be put to use in a number of ways. Developing student's reading speed is a possibility with very few alterations necessary.

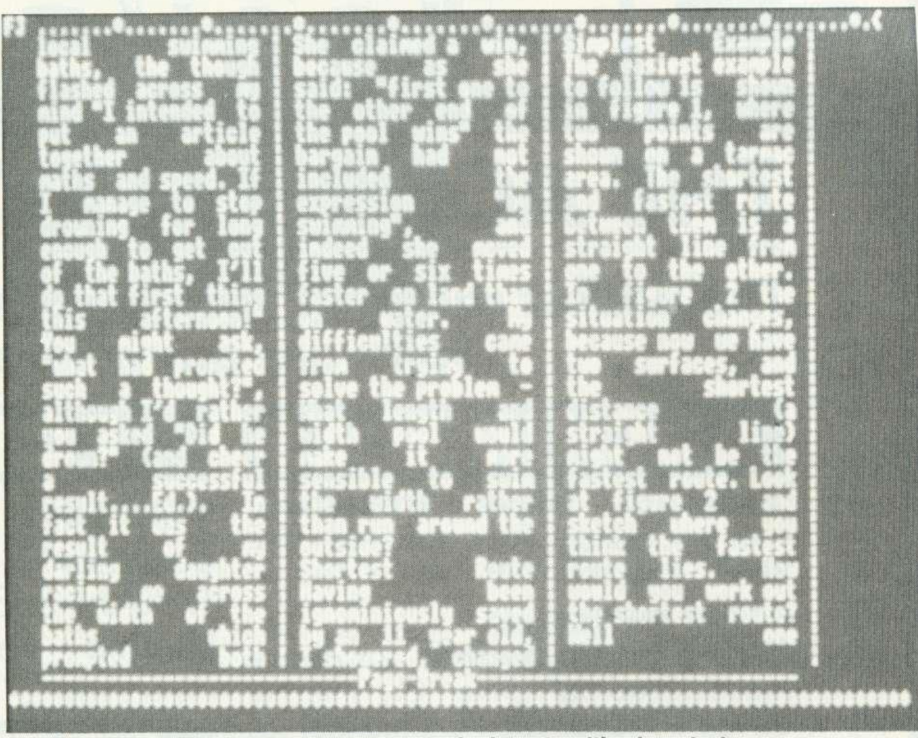
The second of our programs is the longer of the two, but rather easier to explain. All the procedures have already been discussed, and the program simply extends those facilities into a useful application. Quite often when producing newsletters or similar activities, it is useful to have a text printed in several columns across the paper. Listing 2 on the yellow pages allows you to do that. By taking a wordprocessed file, it sets them into a given number of columns of a given width. Type in the program and save it as B.COLUMNS. It's probably worth setting up a couple of exec files to handle the system, so create a file called !View:

```
*BUILD !VIEW
    0001 *BASIC
    0002 MODE 3
    0003 VDU 19,0,4;0;
    0004 *WORD
    0005 SET FI
    0006 NEW
    0007 *.
    0008
ESCAPE
```

and after saving a wordprocessed file, an exec file called !Col could load and run the column program:

```
*BUILD !COL
    0001 *BASIC
    0002 MODE 7
    0003 CH."B.COLUMNS"
    0004
ESCAPE
```

With a document on disc, you could start up the Columns program with *E. !Col and when the title page appears press Space. The program now asks a number of questions. It checks the name of the file to convert, the number of characters per column and the space between columns. Finally it asks the number of columns per page and whether you want the columns justified (straight margins on both sides of the column).



Joe's second program allows you to create and print out multi-column text

Remember that the result of multiplying the number of characters and spaces per column by the number of columns should give fewer characters than the width of your printer carriage, and in any case less than 132 characters. Once the last question is answered, the program opens the file indicated and converts it to a padded text file where every line is the width of one column.

In order to make the column conversion more powerful, lines are pulled together, and a new paragraph is only begun if a double Return is encountered in the file. This would be seen as a blank line between paragraphs in the original *View* file.

This temporary file is in effect a long thin strip of text that publishers know as a 'galley'. It's saved as WTEMP, and could be used for further modifications if required. Once the temporary file is ready, the program asks whether it should continue, or whether you want to modify this temporary file. If you press Escape to do this, then the file is read into *View* ready for working on.

Next you are asked whether you want to print out directly, or to create a file which can be read into *View*. Next the option of putting a character between columns (to make a margin) is offered. Either type a Space then Return, or type

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the ¦ (double bar) symbol, near the Break key, then press Return. This would give the effect of a dotted line between each of the columns.

Next the program asks for information about page size, and if you select the defaults, then it assumes a page which can contain up to 56 lines of text plus 10 blank lines between each of the pages. If you want to set particular page formats, then select N for no defaults, then enter the page length and page gap details.

The page gap is ignored if you eventually decide to go for a file to load back into *View*. Finally, you are asked whether you are using a manual feed or an automatic feed printer.

Once the last question is answered the computer uses the temporary file to build up pages with columns and these are either spooled to disc or printed out.

Special printer codes are not included, so they should be sent to the printer prior to starting the program, or you could add them to the program. In particular, you might want to set the printer into condensed mode, so that more characters can be printed per line. You could insert a line of program like

```
This is a Video Script Scrolling
demonstration. We simply type our
script in the VIEW wordprocessor,
and then we save it as a file.
This one is saved as SAMPLE.

Next we switch to the scrolling
software by typing
```

Upward scrolling text makes it easy to read

VDU 2, 1, 27, 1, 15, 3. The first few lines of the program hold the default page size information in two variables – linesdefault and gapdefault.

If you choose to opt for a spooled file, then pressing Escape at the end will take you into *View*, and will then load the spooled file for editing. Please note that it is extremely easy to lose the column organisation in *View*, so be sure to edit carefully.

Remember too that the lines per page is fixed by the program. You can only modify the top and bottom space, for example, by adding headers and footers. If for example you have opted for a 56-line page plus a gap of 10 lines between pages, that's correct for typical 11-inch printer paper. But when you actually read the file into *View*, the 10-line gaps won't be there. *View* assumes a 66-line page, including four lines of top margin, a header line, four lines of space below the header, four lines of bottom margin, a footer line and four lines of space between the text and footer.

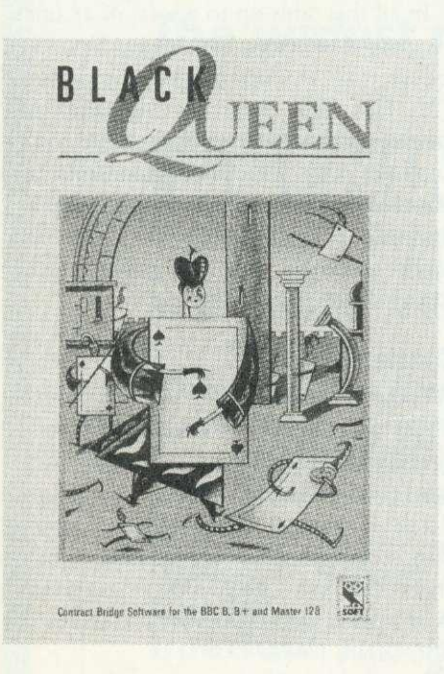
In all that adds up to a total of 18 lines of space – or eight too many. You can reduce it to 10 lines of space by putting TM, HM, BM and FM commands in, making each of the four margins only two lines deep. Other line commands can be added freely, as can highlights, therefore I tend to use the spool file facility quite a lot, in preference to straightforward printing.

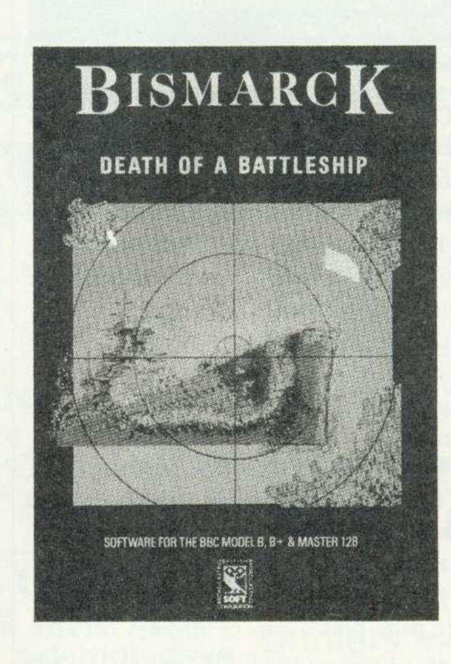
Conclusion

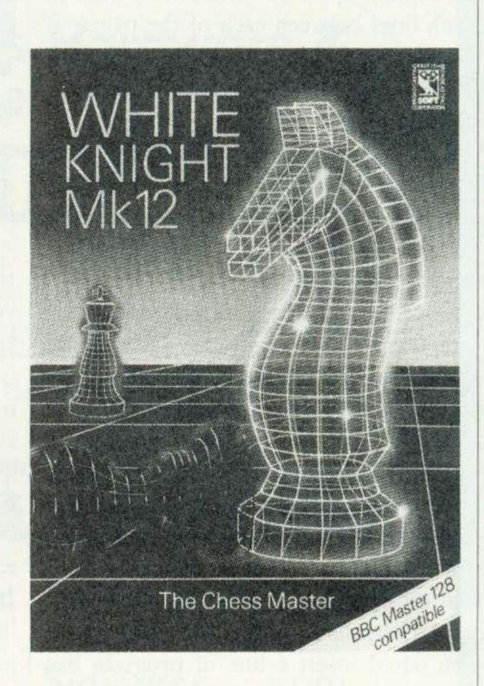
Whether you're a hobbyist, or an educational user, hybrid wordprocessor packages like the ones we have described here can save you both money and time. Readers keen to find out more about Basic wordprocessor applications should check out my Crossword program and Wordsearch generator in back issues of *BBC Acorn User*.

OFFERS

BBC GAMES







Play while you learn

The three BBC games on offer this month are all a little bit more than games, they are great fun to play while being excellent teaching aids. So pick up one or all of these games and learn to play battleships, bridge or chess this year.

Re-enact the most memorable naval battle of the second world war with *Bismarck*, the enthralling strategy game based on the Royal Navy's frantic search for the predatory German battleship *Bismarck* in the spring of 1941. Pit your wits against the computer or take either the British or German role against the other player. You could try an exciting alternative battle plan and remake history!

Every time you play, the User Guide also gives you all the historical background to the battle. *Bismarck* is available for the BBC B, B+ and Master 128 at only £14.95.

Black Queen is an absorbing contract bridge program, a must for complete beginners or experienced players alike. In addition to features such as bidding, playing and scoring, you can construct deals from standard or 'Classic' ones in books or newspapers, and experiment with 'tailor-made' deals. *Black Queen* offers you an almost inexhaustible source of bridge enjoyment and comes on disc for the BBC B, B+ and Master 128 at £14.95.

White Knight Mk 12 is a game with the features offered by a sophisticated and powerful chess program. These include a 'thinking moves ahead' display and a facility to step forwards or backwards through 120 moves. You can also change sides with the program or try out the frantic pace of playing 'blindfold' chess! *White Knight* also features pawn promotion and elapsed time clock for white and black. The game is an advanced update of *White Knight Mk 11* and is on disc for the BBC B, B+, Master 128 and Master Compact at £14.95.

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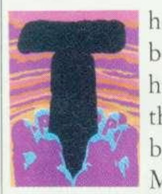
Signed ______ *Date* ______

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RITES OF SPRING

What do druids, cops, worms and Stonehenge have in common? They all feature in the best ever type-in game for your BBC micro

Chris Ruseman



Thousands of years ago, before the dawn of history, hideous creatures roamed the Earth and Man was both hunter and hunted. Many mighty warriors were brutally slain, defending their homes and families from the continual onslaught.

'In the early dawn of human existence, pagan gods were worshipped in the vain attempt to ward off the accursed fiends, and the rocks ran scarlet with the blood of animals plus, in certain districts, human sacrifices. Countless nights were pierced by the blood curdling bleats, plus in certain districts screams, of the victims. And those were the lucky ones.

'Naturally, quite a lot of people got annoyed after a few years of these ceaseless offerings, and so relinquished their independence and called upon the druids for assistance. The druids agreed, and constructed a mystic charm to ward off evil hordes. This charm was fashioned from the Seven Runes of Brationst. Each Rune was procured at great expense, but before the end of that year, the Cumentexis of Fire (for that was the name given to the charm) was created and presented by the Chief Druid to Mankind. It all happened at a solemn ceremony somewhere near Basingstoke.

'As soon as the charm changed hands, the final binding occurred; the Runes blazed with incandescent fire and the foul devils were sent scurrying back to whatever holes they had crawled out of. Man was saved and could confidently go to the pub in the evening without fear of being eaten...'

Well, at least now you know what you're up against. The Cumentexis of Fire has fallen apart and unless someone can rebuild it, Mankind will again be under the proverbial thumb of *them*.

Our only hope is to send someone back in time to when the charm was constructed and, er, um, well, make a better job of building the thing!

You see, the future of the human race is rather in the balance. 'Just think, somebody could come out of this very famous and, er, um, rich!', says your controller.

It suddenly dawns on you who this 'somebody' might be. But before you can answer you find yourself being rushed down the corridors of Time Control Headquarters to the Lab, where you're forced into a flowing white cape with matching pointy hat and bundled into the Temporal Vortex.

'Good luck m'boy, I hope you do better than the last Runemaker. Remember, millions of people are relying on you! And with that the Vortex rips you apart atom by atom and sends you many aeons back in time... You hear your boss's voice echoing down the millennia: 'Good luck, Commander'.

The Vortex disappears with a sort of wet flopping noise and you find yourself on a large plain dotted with the ruins of ancient monuments, and yes, it's raining.



You must collect a total of seven runes

Oh well, I suppose you'd better get started. Hmmm, is that a Rune I see over there?

Playing the game

You can now re-enact the quest of *Runemaker – Codename: Druid* in the comfort of your own home.

To control the druid use the 'Z' and 'X' keys to move left and right, ':' to jump onto certain objects and Return to cast spells. Other keys used include S and Q for turning the sound on and off and COPY and DEL for pause and unpause.

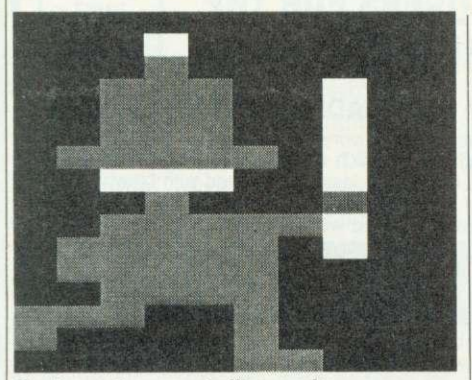
Your energy is maintained from pep pills

The main object of each round of the game is to collect the seven runes and take them to the altar stone, where the Talisman will be constructed.

On your quest, you will have to deal with three different adversaries. First there are the LEOs – Law Enforcement Officers. They appear randomly and patrol the ground level of each screen. Then there are the ELIs – Extra Large Inchworms – who also appear randomly. They have a nasty tendency to drop on top of you. They usually try to crawl along rock or earth, but will fall off anything if they can.

Your final foe is the least predictable –

ILLUSTRATIONS BY GEOFFREY APPLETON


The law enforcement officer sprite

the GBW or Great British Weather. When the game starts, the weather's quite calm, but later in the game, it may become stormy and the cloud will unleash bolts of lightning!

If you collide with any of these enemies, or if you fall too far you will lose energy. This is indicated by the horizontal bar in the top area of the screen. If this bar ever reaches zero, then you'll lose one of your three lives. If you lose all three lives or you run out of time, indicated by the candle on the right, then the game is over and Mankind is doomed unless of course, you have another go.

You are not completely helpless against these nasties, as the TCSs (Time Control Scientists) managed to rig you up a PPP (Portable Plasma Projector) which conveniently discharges one of the more popular druidic spells of the era. You can use this to knock out the LEOs and ELIs at the cost of one energy unit. But however, you have no protection against the GBW – one zap from a bolt of lightning and you'll suffer a severe drain in energy. But you'll be pleased to know it does have the same effect on the LEOs and ELIs. You can regain energy by collecting the magical energy pills that get thrown back through time to help you. These 'hamburgers' appear on the screens from time to time.

The runes are dotted randomly around the game screens. Some are easy to reach, some are more tricky and may involve jumping from one screen to another. There are aids to finding the nearest rune. Arrows below the energy bar point to the nearest collectable item (hamburgers or runes). Points are scored for disposing of the LEOs and ELIs, and for collecting runes. A bonus is awarded for the time left at the end of the round.

The game gets harder on later rounds: you get more lightning, more enemies, fewer energy pills, less time to complete the level and, later, invisible runes (they only show up during lightning flashes).

When you have collected all seven runes, go to the altar screen and stand on the middle of the altar. A mystic note will sound. In fact, this is an ancient but little known druidic blessing chant, accompanied by the 'magical massed pan pipes of Brationst: while this goes on, the runes at the top of the screen flash to show the new Mark 2 Cumentexis has been successfully reconstructed. Now all you have to do is repeat it with the more difficult conditions of the next round.

How it all works

The main game starts at .gameloop. Several data tables are initialised, clouds are positioned randomly and the runes are created. The candle is built up by .buildcan which uses the subroutine .mainshowcan to display a single section of the candle. Each time the game is played, or the druid moves to a new location, control passes to .screenloop whereupon the subroutine .setupscreen is called to display the background scenery. This also stores a set of numbers describing the various bits of scenery used in a byte array called screen%. The main playing loop begins at .playloop.

.collide	detects collisions between objects
.makerune	generates a rune (or energy pill) at a random location
.cloudy	displays the cloud
.recharge	increments energy level (if possible)
.discharge	decrements energy level (if possible)
.showcan	displays the top section of the candle
.show	general purpose sprite-plotting routine
.fx19	waits for video sync
.sprong	releases a bolt of lightning
.dodruid	druid 'service' routine – checks keys etc
.dopoliceman	LEO service routine
.doworm	ELI service routine
.showspell	displays spell
.wipespell	deletes spell
.calcaddr	calculates screen address from co-ordinates
.howfardown	looks below a point to find the nearest solid ground
.setup	de-compacts screen data and shows scenery
.wipeout	restores scenery for four points
.specupd	restores scenery behind a given point
.create	adds a 'nasty' where appropriate
.inkey	checks for a specific keypress
.vdu19	performs a colour change
.rand	generates a pseudo-random number
.storenasties	preserves positions of 'nasties' for when you return to a screen
.game	the main entry point – copies data down and jumps to main game loop (eventually)

Table 1 – main subroutines

There are several distinct processes that go on within .playloop and these take place in a particular order. First, new foes are created. Then the energy level is updated, lightning dispatched, and all animinated characters are deleted from the screen by restoring the background scenery (at .unstloop). Animated characters are then shown at their new positions (.stloop), the candle is updated, and the cloud moved. If there is a spell on the screen it is moved, and checks are made to see if it has hit anything.

If there is a rune on the screen it is displayed, and checks are made to see if you have collected it. Finally, all the animated sprites are moved to their new positions and their own subroutines (.dodruid, .doworm etc) are called to work out what they will do next.

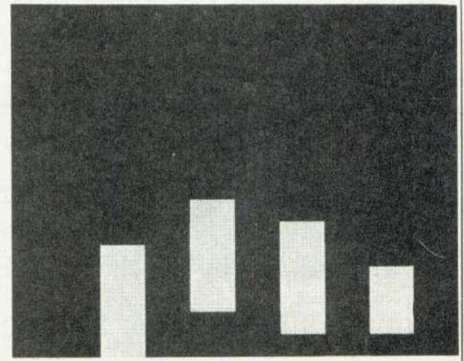
At this stage, the checks are made to see if you have collided with a 'nasty' – if so, .discharge is called to reduce your energy level..

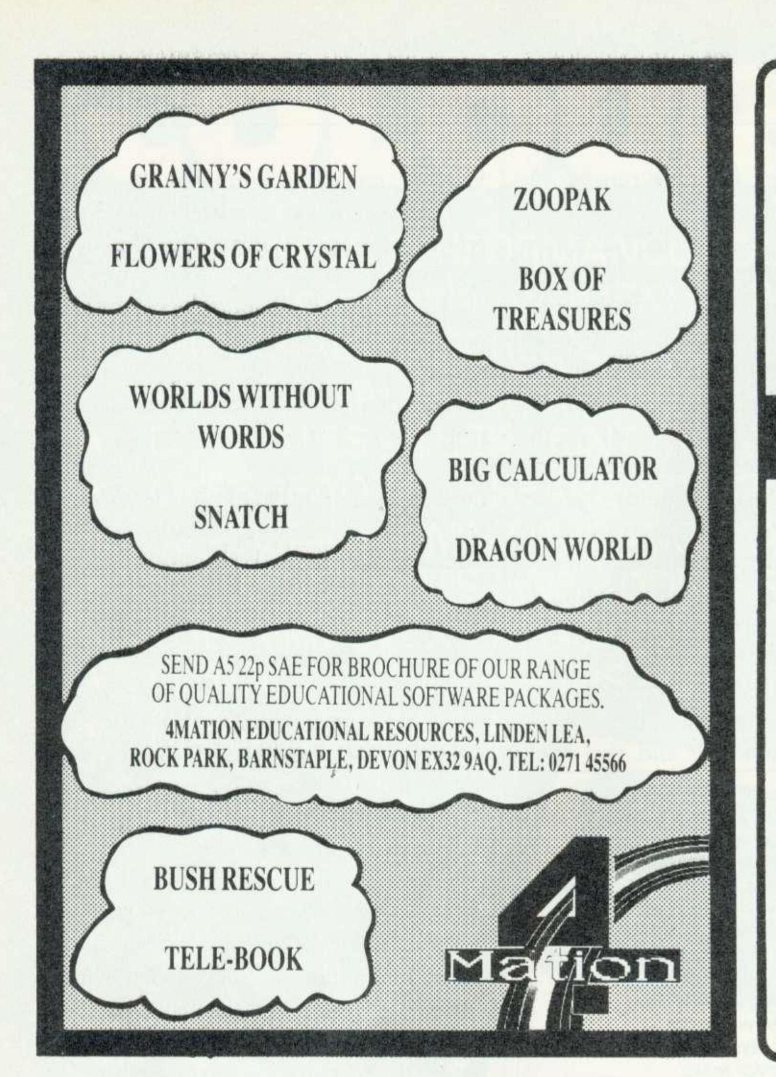
Last of all a check is made to see if you have reached the edge of the screen, in which case all the LEO's and ELI's positions and directions are stored in a 256-byte table at .hideout. This allows them to reappear in their old positions when you return to that screen. Then 'level' is updated accordingly and control passes back to .screenloop. After this, all that needs to be done is reduce the number of lives when you die. The game ends when the life count gets to zero.

The druid, LEOs and ELIs are all dealt with in nearly the same way regarding movement. There may be up to four 'nasties' on the screen at once, so there are five animated sprites in all (including the druid). Every one has a byte in each of several tables.

These bytes include X and Y co-ordinates, rates of movement in each direction, and in the 'exists' table, a byte indicating the type of character. Sprite 200 is always the druid.

Each character type has its own special subroutine (the addresses of which are stored in the typetab table) and this is called to find out what the character will do next. The druid's own routine checks


The sprite for the inchworm



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keys for left, right, jump and fire as appropriate. The LEO and ELI routines check for movement off the screen and, for ELIs, whether they are about to fall off something.

The sprites used in *Codename: Druid* come in a variety of shapes and sizes. Consequently, there are four different routines responsible for plotting them on the screen.

Animated sprites present the most problems since they can walk in front of – and must therefore preserve – the background scenery. A system of masks is used to enable this.

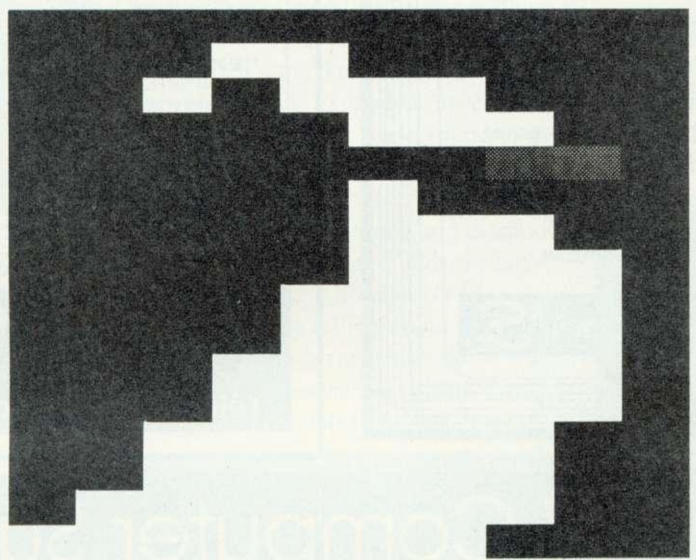
Each animated sprite consists of 80 bytes of data. This is mode 2, so each byte is two pixels. The bottom six bits are actual graphic colours for the pixels, and the top two bits show whether each of the pixels is transparent. Take the Druid as an example. In reality, the Druid sprites are defined within a black box, but so that this box isn't shown on the screen, the pixels around the Druid are made 'transparent' by setting the appropriate top bit of the mask byte. A byte of sprite data is plotted by examining the top two bits of the sprite data. If both are clear, then there's no mask involved, so the byte is plotted on the screen.

If both mask bytes are set, both pixels are transparent so no plotting is needed. Otherwise one of the pixels needs plotting. The appropriate bit mark, whether &55 or &AA, is applied before plotting on the screen. The routine responsible for showing animated sprites is part of the main loop and begins at .notdead. Using this is 12 per cent faster and needs only half the sprite data than a normal LOAD/AND/OR/STORE sprite plotting method.

The scenery

The scenery is made up from a selection of 30 background sprites. Each of these is the same height as the Druid (16 pixels) but slightly wider (12 pixels in all). Background sprites are plotted when a screen is first entered, and also when an animated sprite needs to be unplotted. It is because of this unplotting that the routine for background sprites must be very fast. Moving sprites must be deleted for as little time as possible, to avoid too much flicker.

If the Druid is in mid-flight and crosses the boundary of four background squares, all four must be re-plotted when erasing his image again. The subroutine that plots background sprites is at .updatesquare and takes a single parameter in X. This must be in the range 0 to 95, where 0 is the background sprite in the top left of the playing area and 95 is the sprite in the bottom right. The plotting is done using on 'unrolled' loop, consisting of load and save instructions using a Y offset. Instead of branching back and looping round 48 times, the whole of the code is repeated 48 times, Each background sprite is made up of two rows of 48 bytes each. This in-line code is faster than a loop that's used 48 times, because it does not require any time for branching or counting. To speed things up further, two pairs of tables are used – backrlo%, backrlo%, backrhi% and backwlo%. These are initialised by .setupscreen and contain, for each background sprite, the address of the sprite data and the screen address at which to display the sprite.



The druid's flowing white cape and pointy hat is clear from the sprite

The third sprite-plotting routine begins at .show. This is a slower, general-purpose routine that is used to display the clouds, the candle and the runes. The routine is called with X and Y containing the screen position of the sprite to be shown, and A containing the width of the sprite in 'byte columns'. In addition, read and read+1 must contain the address of the sprite data to use.

The sprite data is ANDed with a mask – so when the mask is clear sprites such as the runes can remain 'invisible'. You will notice that .showcan – the routine to display the candle – simply 'falls into' .show for added speed.

The last sprite-plotting routine begins at .spr. It plots 'animated' sprites, but in stationary positions, such as the druids in the life counter. It's simple, short and reasonably quick.

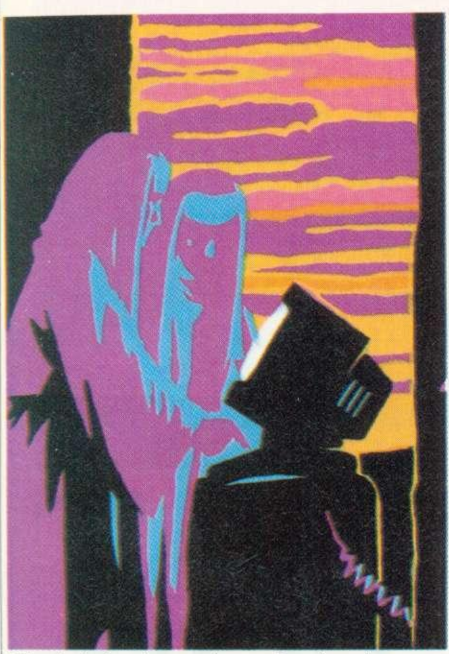
Restoring the background

When the moving sprites are deleted, the background must be restored. This is done by the subroutine .specupd which takes two co-ordinates in X and Y. The routine works out which background square this point lies upon and, if it has not re-displayed it already, shows the background sprite by falling into .updatesquare.

Because you cannot rely on an animated sprite standing wholly in front of a background sprite, .specupd is called four times – once for each corner of the sprite. In this way you can be sure you don't leave any bits of druid lying about!

So that background sprites aren't re-plotted unnecessarily, the top bit of the screen % byte array is used to show any that have already been shown this time around. So when two LEOs pass each other for example. It is only possible for one or two background sprites to be re-plotted. Your current energy level is stored in .energy, and is increased and decreased by the routines .recharge and .discharge. Ongoing changes in energy are performed using the variable ench. If this contains a non-zero value, the energy level is updated the appropriate number of times. Spells are shown and deleted by .showspell and .wipespell respectively. These use the general subroutine .calcaddr which calculates a screen address from X and Y co-ordinates – which is also used by the sprite-plotting routines.

The rather dramatic weather featured in *Codename: Druid* springs from the subroutine .sprong. A random direction is chosen for the lightning bolt, and stored in zdx and zdy. The former contains -1 if the lightning strikes leftwards or +1 if it strikes to the right. The size of the value in zdy determines the angle of the bolt.



The bolt begins under a cloud and moves down until it hits something. Then the subroutine .collide is called to see if there were any casualties. If the Druid is hit, .adden registers the fact.

Nasties are vaporized by adjusting their byte in the exists table. Flashes of sheet lightning are performed by .flashit – which changes the background colour byte in light. This is eventually noted by the main loop, and the background of the screen (logical colour 6) changes hue accordingly. Colour 1 also changes to highlight some of the scenery.

Spells and lightning are displayed in a similar fashion. Normal animated and background sprites only use colours 0 to 7, and not the so-called 'flashing colours' 8 to 15. So two bits of every screen byte are largely unused. It is these two bits that contain the spells or lightning.

There are eight bytes that can be varied to control the difficulty of a round. These are stored in a block at .rounds. The bytes control the initial height of the candle and hence the amount of time you've got, the number of nasties, the number of energy pills, the number of runes that are apparent at one time, and where the runes are easy to see or only visible during lightning flashes. The other three bytes control the weather in a complex and devious manner.



The altar is where you must offer your runes

Weather and scores

There are several other routines in the game which perform various important tasks. The .setupscreen routine performs three things. First it expands the backround graphics data for the current screen from five to eight bits.

As there are only about 30 different bits of background, each one doesn't need to take up a whole byte in the main data. But it's quicker to get at it during gameplay if it's expanded. It calculates addresses for all the background sprites on the screen (ie, where the sprite data is stored) and finally, it extracts all the nasties' previous positions and directions for that screen from the .hideout table.

A routine at .howfardown is vital when sprites are falling down the screen. It's used by both the druid and the ELI plotting routines. When given a screen position, it calculates the next lower safe place to stand. The score is updated by .addsc. In turn it then calls the general 'print in decimal' routine called .dec. Sound is generated by feeding either of the two routines, .sound or .sound2, with an offset into a table of sound data at .noises. Sound2 simply calls .sound twice to play more complex noises.

Random numbers are needed throughout the game. They use a tried and tested 'ring counter' method at .rand. Calling .rand gives you a pseudo-random number between 0 and 255.

HOW TO ENTER

■ Listings 1 to 6 assemble the code. Listing 7 is the checksum program. Listing 8 is the data constructer that expands all the data, and Listing 9 is the Basic game loader.

■ Type in all the listings, and save them on a blank disc. To assemble the game, first run Listing 8, MakeDat. That saves several files of data onto the disc.

■ Then set PAGE=&3200, and run Listing 1. This also chains the following Listings 2 to 5. These assemble the game code itself. Listing 6 is also chained; this loads in all the data files and assembles the rest of the game. Then it saves the final product, a file called Druid2.

■ Finally, it chains Listing 7, the checksum program. If any errors are reported, then it gives you a listing number to indicate the error. If no errors are reported, then the Druid2 file is all correct. Finally, you might want to press CTRL/Break.

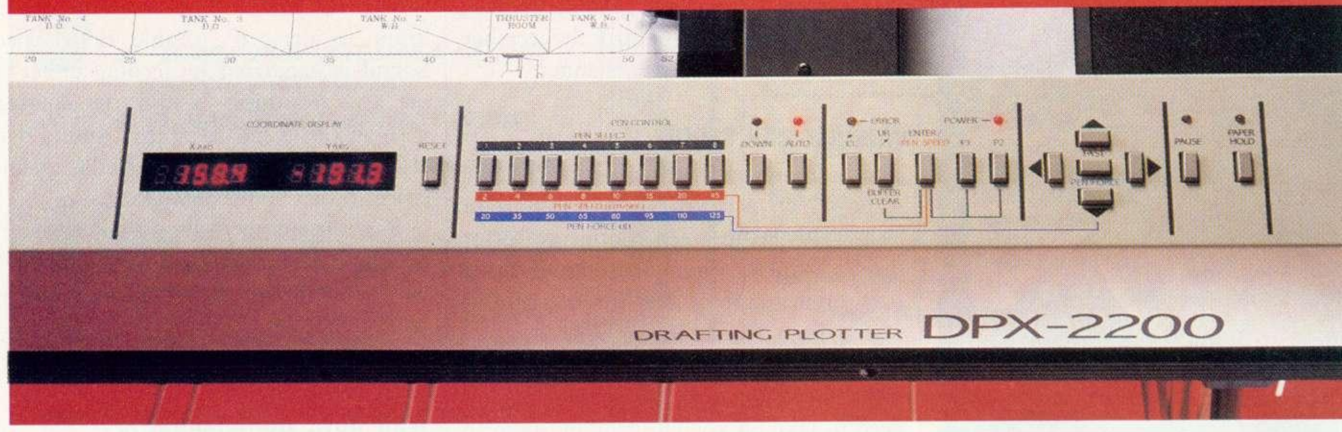
■ To play the game, you can CHAIN the Basic program in Listing 9, "Druid". This loads in the Druid2 machine code, and the game will start.

Well now, Commander . . .

There is nothing more to say beyond wishing you good luck in your runemaking endeavours. Remember – Mankind is counting on you...



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MONEY MATTERS

We conclude our look at the business software scene by looking at the more expensive end of the market

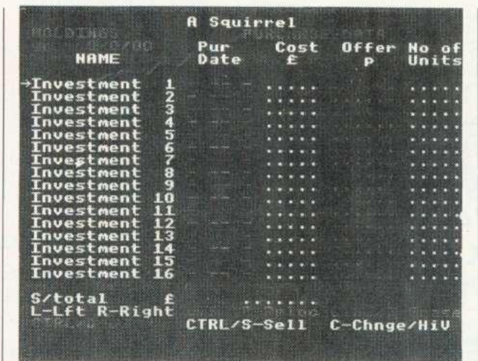
Roger Carus

Last month I argued that the best solution to most business-type problems using computers was to choose the simplest program running in the cheapest hardware. This approach costs less, offers fewer chances of mistakes and requires the least training. There are however times when that advice will not work, and the problem is to know when you have reached that point.

If the computer and software you currently use do not seem able to perform an important type of job, then it may be because the demands you are making are too great for the RAM (random access memory) of the machine, the speed of processing, the capacity of the disc filing system, the definition of the monitor – or simply your way of using them. Alternatively, it may of course be the limitations of the program you are using to do the job.

Taking first the memory, the BBC Master is capable of most standard uses on the basic software of wordprocessor, spreadsheet and database.

Modern wordprocessors segment text so that large jobs can be broken down into 'chapters' and there are very few occasions when it is essential to have long passages of text in memory at one time. With a disc system there is not much of a problem about having an average novel on a single disc in a series of files.



Squirrel's Care series – easy to use

Spreadsheets are more of a problem in theory because with a large model they may exceed the memory capacity, although in my experience it is usually possible to construct a series of templates where only a few details need to be transferred from one sheet to another and most types have a facility for exporting sections in isolation. Put more simply, a series of related calculations can be done on one sheet in memory, and then the products transferred to another, and so on. It sounds complicated, but isn't really.

Databases present greater difficulties because the capacity of the memory and the disc system can limit the volume of the processing program and also of the data stored, although often several thousand records can be stored – provided they are relatively simple.

I will return to this problem later, but it is much more likely to call for new software or equipment.

Special programs for accounting and related purposes present more problems since a small business with numerous transactions can easily generate too many records for a non-specialist machine or program to handle at a reasonable speed, at least with comfort and ease to the user. Even here it is worth thinking whether you can break down the work into smaller units – for example, you could begin keeping monthly rather than

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Panasonic KX-P1081 .... 135.00

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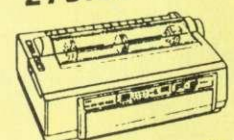
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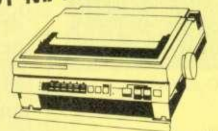
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(Subject to availability)

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200cps wide-carriage. Inbuilt tractors allow fast paper slew rates, and PC and Epson FX compatibility.
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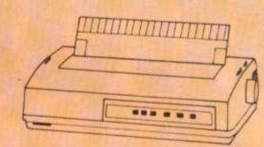
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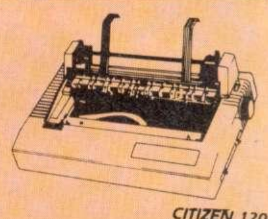
P6+ *80 characters*	*434.00*
P7+ *136 characters*	*608.00*

DAISYWHEELS

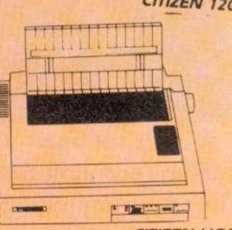
BROTHER HR 20 Daisywheel 8K standard buffer upgradable to 16K. Standard serial/parallel port	338.00
JUKI Daisywheel Juki 6200	320.00
QUENDATA GPR-2000 Print speed of 18 characters per second. Fully Qume compatible. Takes Qume exchangable Daisywheel and ribbons. Selectable 10, 12 & 15 pitch. Supports proportional spacing. Standard friction feed. Tractor/cut sheet feeder and serial interface optional	146.00
CITIZEN Daisywheel Premiere 35 35cps 15" daisywheel. Diablo compatible	399.00

PRINTERS

CITIZEN 120D *Dat Matrix Printer. 120cps NLQ. 2 year warranty. You have to see the quality at this price.*	*117.00*
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PRINTERS

annual accounts, and then merging the key figures at the end of the accounting year.

In this connection it is worth pointing out that many a trial balance or even final trading account and balance sheet can be produced quickly and efficiently using a spreadsheet which can be laid out once, to match the needs of the user, and then used as a basis for future years. It may not be elegant but it works well and is much cheaper than buying an accounts program with that facility.

Several good specialist programs exist including the *Contex Bank Manager* (£20.25 to £28.75, according to model) and also the supporting *Business Utility Packs* (£14) from Contex Computing. There are also several useful programs for monitoring investments, such as *SIFT* (The Small Investor's Finance Tally) from CR Software.

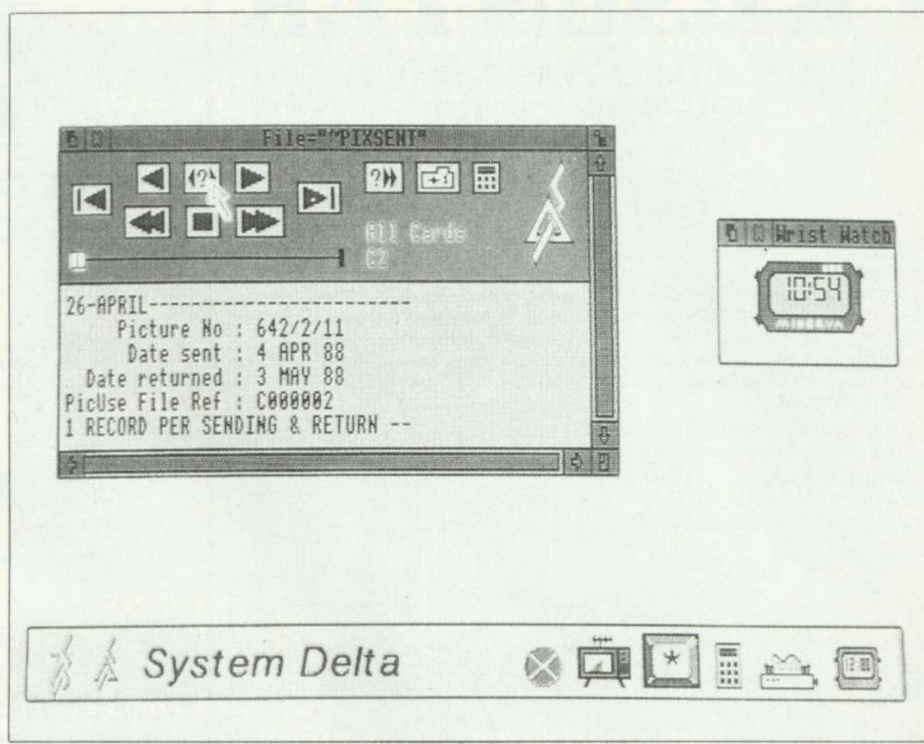
A much more advanced series with a similar purpose but much more analytical, is *ShareMaster* (from £24.95 to £249.95, depending on the model being used and what is required) from Synergy Software. For those who like an exciting life it also produces a similar analysis package for *Traded Options*!

Other interesting packages of this type come from Squirrel Software which has been in the business for a long time. It offers the *Care* series for cash, building society, VAT and investment for only £29.95 to £34.95 (according to model). Although quite basic, they perform well and are easy to follow.

The use of good peripherals meeting the latest standards is another way of improving your system, and if you do not have a twin, double-sided disc drive working on 80 tracks you are missing the opportunity of massively increasing your capacity to process data.

The cost of disc drives is not much more than it was three years ago, and many of the better accounting programs are capable of using all four drives of the disc. I am less certain of the benefits of the double-density disc filing systems, since they bring other complications, not the least being compatability. I would, however argue that any you buy should be switchable to 40-track, since the cost is quite small, and the transfer of older records is made easier.

In the case of monitors the benefits of colour are related to what you are doing with the equipment. If the uses are mainly text and figures then the advantages of having colours are much less than those from higher definition. If, however, you are using graphics (which naturally flow from data analysis) or moving into desktop publishing, then you must accept the cost of colour.



System Delta Plus: the first database for the Archimedes and popular with business users

Finally, among basics, there is the choice of the printer, and this poses many problems which defy generalisation. Most of my work is with text and figures, often for others to use, and I feel a need for a good quality, but not particularly fast, daisywheel printer.

Occasionally, I need diagrams and then I am obliged to use a dot-matrix printer, but no matter what the salesmen say, I am never convinced by the 'letter quality' printers. To me they are clearly recognisable and look amateurish for professional correspondence purposes, but are quite sufficient for most uses within a business.

The one exception is probably close numerical text which must later be audited in search of errors, since reading small text can be very tiring.

Of course, if money is no object, then use a laser printer which gives you the best of both worlds, and remember that the cost of buying one may actually be helped by the Inland Revenue.

There will be times when the most ingenious solutions of this kind will not be enough, and it is to these that we must now look. It is a serious matter if you have already built up data which you will need to transfer, and that itself may dictate what you must do next.

The obvious question is 'at what point do you have to change the basic computer you are using?' This is not easy, and depends very much on circumstances. The original BBC micro is quite unbeatable in my view for its versatility, but it has distinct limitations in capacity. The Master is certainly a more powerful machine and would be my choice for most work.

Programs like *View>>Mac*, Version 2 (£68) from Human Computer Interface can transfer Macintosh documents into *View* on the BBC micro, and vice-versa. Clever though it is, it's a limited market, though useful if you've got a lot of BBCs, used as wordprocessors, feeding into a Mac for laser-printed DTP.

Archimedes software

But what about the Archimedes? (£804 to £2851). I admire it greatly, but there is only a limited choice of software for it, and the additional cost is quite a serious consideration. True, with the addition of a PC Emulator (£114) it can run most IBM software, but the cost seems to rule that out when IBM clones, and even the originals, can be purchased for much the same or even less.

The time to choose an Archimedes is when processing speed or graphics capability are of prime importance.

The Archimedes really comes into its own with software like *GammaPlot* from

Minerva, or Lindis' *Presenter*. These were reviewed by Peter Sandford in the November 1988 issue of *Acorn User*, and allow you to present your figures from an Arc spreadsheet in easier-to-understand graphical form.

In choosing the software you can either use simple systems as before or break the job down into smaller units as suggested. Alternatively, you can use highly flexible systems with large capacity disc storage – most solutions are likely to be of this last type.

There are two kind of accounting packages available. The simplest may be thought of as a series of record sheets like a ledger, with sub-totals which feed into fixed balance sheets. You can set these up on a spreadsheet if you want, but the important thing is that the position of each entry is fixed, and although figures can be changed, the layout is largely decided at the start.

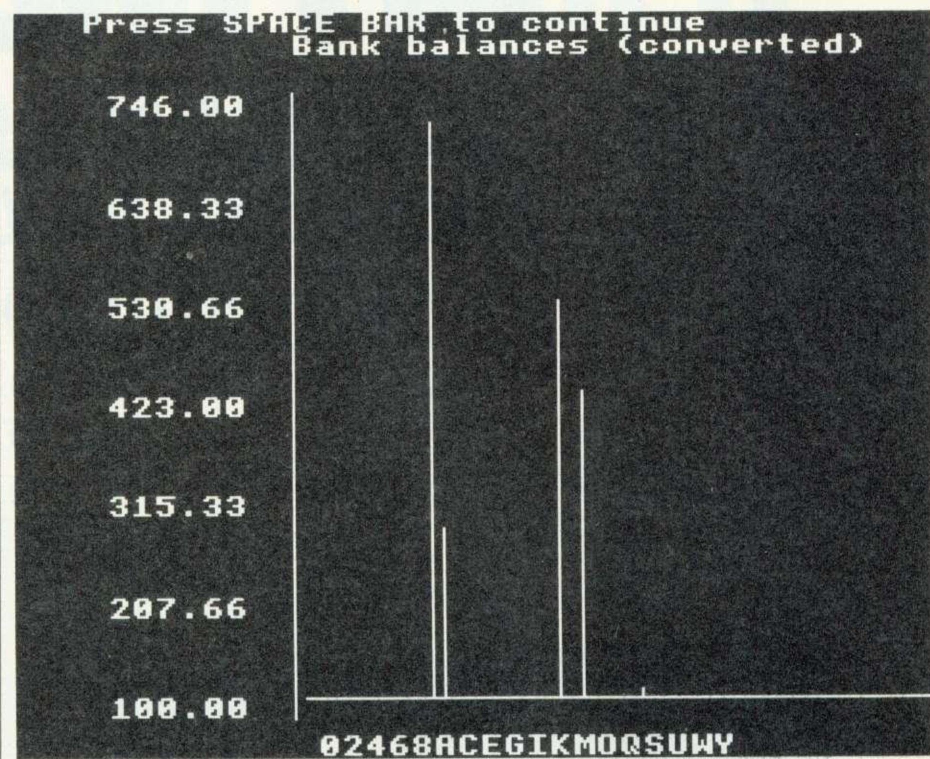
The other kind is more like a bundle of separate transaction records, and you can think of each as written on a small standard sheet which can be sorted in many different ways. In other words, a database, with records consisting of fields which can be presented as required (eg, date, quantity, purchaser, price and value).

This database approach is clearly better for many purposes, but it does have a problem, which is that you need a suitable set of programs. If you are keen, and have the time, you can construct your own from almost any good relational database, and several popular solutions using an IBM type of computer are of this kind, using *dBASE+* and *Oracle*. You can do exactly the same with a BBC micro on any of several readily available databases. The only problem is that it takes time and knowledge.

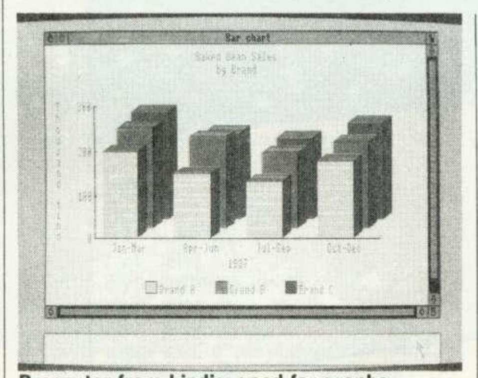
A cheap and simple system – but inevitably more limited in practice is *Money-Wise* (£69) from Derbyshire Software, which offers most basic accounting functions. In much the same way Mitre Software Ltd produces *Flying Start II* (£99.95) which looks equally good, although I have not used it.

Alternatively you can buy your system 'off the peg' and Minerva Systems which produces a variety of business applications will readily write others to meet special requirements – at a price.

The central unit for all the Minerva applications packages is the appropriate version of the database – *System Delta Plus* (£69.95) written for the Archimedes or *System Delta* with *Card Index* (£64.95) for all BBC models. In each case you will need the Programmers Reference Guide (£29.95 and £19.95 respectively). This is reasonably priced, but I do feel it is misleading to price them separately, although it is a common practice.



The Contex Bank manager can be further enhanced by Business Utility Packs



Presenter from Lindis: good for graphs

Once you have the basic program you can buy the Nominal Ledger, Order Processing/Invoicing, Sales Ledger, Stock Management and Purchase Ledger modules for £64.95 each for Archimedes and £45.95 for BBC models. The large capacity (over 2 billion records and 16 billion fields!) makes the Archimedes with hard disc ideal for business use – try sorting that number of records with a slower processor and you will appreciate the benefits of RISC.

There are also the specialist applications packages which have already been developed for schools administration, for video rental and for the librarian on the Archimedes; BBC models have other special programs for hotel management and for newsagents.

More of these specialist packages are in preparation, and if your particular need is a common requirement then it may be extended for others to use.

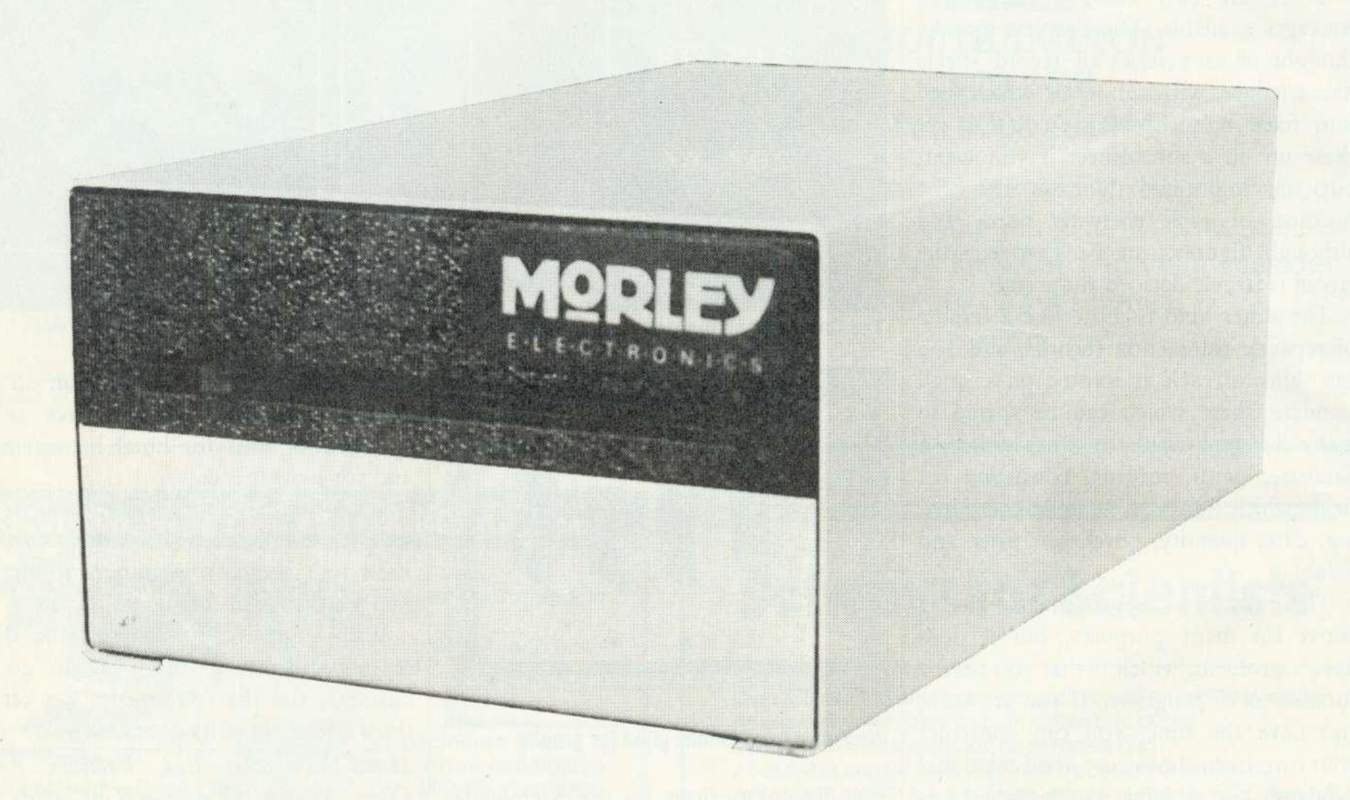
With so many possibilities, the BBC Master still has a long way to go in business, and the Archimedes has yet to show a fraction of its potential.

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YELLOW PAGES

COMPATIBILITY

Program	Page	BBC B	B+/128	Master 128	Master Compact	Electron	Arc	6502SP/ Turbo	ADFS	Econet	Shadow RAM	Monthly T/D
Hints & Tips	41											
Listings 1-2(1)		■	■	■	■			■	■	■	■	■
Arc Agora	46											
Listings 1-2							■		■	■	■	■
Rites of Spring	81											
Listing 1-9		■	■	■	■				■	■	■	■
Joe's Jottings	77											
Listings 1-2		■	■	■	■		■	■	■	■	■	■
Interlude(2)1	135											
Listing 1-2		■	■	■		■		■	■	■	■	■

Note 1. Requires Sideways RAM and Basic 2 2. Requires Ample.

HINTS & TIPS

Listing 1. Temporary SWR save

```
   10 REM KEEP - Archive
 to SRAM/disc
   20 REM by A W Cumming
   30 REM for B/B+/M/C w
ith SRAM and Basic 2+
   40 REM (c) BAU April
1989
   50 :
   60 gsstr=&F2
   70 temp=&90
   80 osbyte=&FFF4
   90 osargs=&FFDA
  100 osasci=&FFE3
  110 gsinit=&FFC2
  120 gsread=&FFC5
  130 :
  140 FOR opt=0 TO 3 STE
P 3
  150 P%=&900
  160 [OPT opt
  170 LDA #131
  180 JSR osbyte
  190 STY page
  200 LDA #132
  210 JSR osbyte
  220 STX himem
  230 STY himem+1
  240 :
  250 LDA #1
  260 LDY #0
  270 LDX #temp
  280 JSR osargs
  290 LDA temp
  300 STA gsstr
  310 LDA temp+1
  320 STA gsstr+1
  330 CLC
  340 JSR gsinit
  350 :
  360 LDX #255
  370 .loop
  380 INX
  390 JSR gsread
  400 STA fname,X
  410 BCC loop
  420 :
  430 LDA #fname MOD 256
  440 STA dblk
  450 LDA #fname DIV 256
  460 STA dblk+1
  470 JSR zero
  480 LDA #&90
  490 STA dblk+14
  500 LDA #ASC"1"
  510 JSR addname
  520 JSR osfile
  530 JSR mess
  540 :
  550 LDA #ASC"2"
  560 JSR addname
  570 JSR zero
  580 LDA #4
  590 STA dblk+11
  600 STA dblk+3
  610 STA dblk+7
  620 LDA #8
  630 STA dblk+15
  640 JSR osfile
  650 JSR mess
  660 :
  670 LDA #ASC"3"
  680 JSR addname
  690 JSR zero
  700 LDA page
  710 STA dblk+11
  720 STA dblk+3
  730 STA dblk+7
  740 LDA himem
  750 STA dblk+14
  760 LDA himem+1
  770 STA dblk+15
  780 JSR osfile
  790 :
  800 .mess
  810 LDY #255
  820 .messloop
  830 INY
  840 LDA message,Y
  850 JSR osasci
  860 CMP #13
  870 BNE messloop
  880 RTS
  890 :
  900 .osfile
  910 PHX
  920 LDA #0
  930 LDX #dblk MOD 256
  940 LDY #dblk DIV 256
  950 JSR &FFDD
  960 PLX
  970 RTS
  980 :
  990 .zero
 1000 LDA #0
 1010 LDY #16
 1020 .zeroloop
 1030 STA dblk+1,Y
 1040 DEY
 1050 BNE zeroloop
 1060 RTS
 1070 :
 1080 .addname
 1090 CMP #ASC"1"
 1100 BEQ notone
```

Continued ▶

◀ **Temporary SWR save, continued**

```
1110 DEX
1120 .notone
1130 STA fname,X
1140 INX
1150 LDA #13
1160 STA fname,X
1170 RTS
1180 :
1190 .page
1200 EQUB 0
1210 .himem
1220 EQUW 0
1230 .dblk
1240 EQUW 0:EQUD 0:EQUD
0
1250 EQUD 0:EQUD 0
1260 .message
1270 EQUS "Saved "
1280 .fname
1290 ]
1300 NEXT
1310 PRINT"Press a key
to save"
1320 IF GET
1330 *SAVE KEEP 900+FF
```

Listing 2. Temporary SWR load

```
10 REM RESTORE - Rest
ores from SRAM/disc
20 REM by A W Cumming
30 REM for B/B+/M/C w
ith Basic 2+
40 REM (c) BAU April
1989
50 :
60 ram1=5:ram2=ram1+1
70 gsstr=&F2
80 temp=&90
90 osbyte=&FFF4
100 osargs=&FFDA
110 oscli=&FFF7
120 osword=&FFF1
130 osasci=&FFE3
140 gsinit=&FFC2
150 gsread=&FFC5
160 :
170 FOR opt=0 TO 3 STE
P 3
180 P%=&900:srstart=(r
am1-4)*&3FEF+1
190 [OPT opt
200 LDA #131
210 JSR osbyte
220 STY page
230 LDA #132
240 JSR osbyte
250 STX himem
260 STY himem+1
270 :
280 LDA #1
290 LDY #0
300 LDX #temp
310 JSR osargs
320 LDA temp
330 STA gsstr
340 LDA temp+1
350 STA gsstr+1
360 CLC
370 JSR gsinit
380 BEQ sram
390 :
400 LDX #255
410 .loop
420 INX
430 JSR gsread
440 STA fname,X
450 BCC loop
460 :
470 LDA #fname MOD 256
480 STA dblk
490 LDA #fname DIV 256
500 STA dblk+1
510 JSR zero
520 LDA #&00
530 STA dblk+2
540 LDA #ASC"1"
550 JSR addname
560 LDA #255
570 JSR osfile
580 JSR mess
590 :
600 LDA #ASC"2"
610 JSR addname
620 JSR zero
630 LDA #4
640 STA dblk+3
650 LDA #255
660 JSR osfile
670 JSR mess
680 :
690 LDA #ASC"3"
700 JSR addname
710 JSR zero
720 LDA #5
730 JSR osfile
740 LDA dblk+3
750 STA page
760 JSR zero
770 LDA page
780 STA dblk+3
790 LDA #255
800 JSR osfile
810 JSR setpage
820 :
830 .mess
840 LDY #255
850 .messloop
860 INY
870 LDA message,Y
880 JSR osasci
890 CMP #13
900 BNE messloop
910 RTS
920 :
930 .sram
940 LDA #&90
950 STA sblk+5
960 LDA #srstart MOD 2
56
970 STA sblk+8
980 LDA #srstart DIV 2
56
990 STA sblk+9
1000 JSR srwrite
1010 :
1020 LDA #4
1030 STA sblk+2
1040 STA sblk+6
1050 LDA #0
1060 STA sblk+5
1070 ]:srstart=srstart+
&90
1080 [OPT opt
1090 LDA #srstart MOD 2
56
1100 STA sblk+8
1110 LDA #srstart DIV 2
56
1120 STA sblk+9
1130 JSR srwrite
1140 :
1150 LDA page
1160 STA sblk+2
1170 ]:srstart=srstart+
&400
1180 [OPT opt
1190 LDA #srstart MOD 2
56
1200 STA sblk+8
1210 LDA #srstart DIV 2
56
1220 STA sblk+9
1230 SEC
1240 STA sblk+6
1250 LDA himem
1260 STA sblk+5
1270 JSR srwrite
1280 :
1290 LDX #string MOD 25
6
1300 LDY #string DIV 25
6
1310 LDA #ASC(STR$ram1)
1320 STA no
1330 JSR oscli
1340 LDX #string MOD 25
6
1350 LDY #string DIV 25
6
1360 LDA #ASC(STR$ram2)
1370 STA no
1380 JMP oscli
1390 :
1400 .srwrite
1410 LDA #66
1420 LDX #sblk MOD 256
1430 LDY #sblk DIV 256
1440 JMP osword
1450 :
1460 .setpage
1470 PHX
1480 LDA #180
1490 LDX page
1500 LDY #0
1510 JSR osbyte
1520 PLX
1530 RTS
1540 :
1550 .osfile
1560 PHX
1570 LDX #dblk MOD 256
1580 LDY #dblk DIV 256
1590 JSR &FFDD
1600 PLX
```

Continued ▶

ARC AGORA

◀ Temporary SWR load, continued

```
1610 RTS
1620 :
1630 .zero
1640 LDA #0
1650 LDY #4
1660 .zeroloop
1670 STA dblk+1,Y
1680 DEY
1690 BNE zeroloop
1700 RTS
1710 :
1720 .addname
1730 CMP #ASC"1"
1740 BEQ notone
1750 DEX
1760 .notone
1770 STA fname,X
1780 INX
1790 LDA #13
1800 STA fname,X
1810 RTS
1820 :
1830 .page
1840 EQUB 0
1850 .himem
1860 EQUW 0
1870 .sblk
1880 EQUB &40
1890 EQUD 0:EQUW 0
1900 EQUB 0:EQUW 0
1910 .dblk
1920 EQUW 0:EQUD 0:EQUD
0
1930 EQUD 0:EQUD 0
1940 .string
1950 EQUS "SRROM "
1960 .no
1970 EQUB 0:EQUB 13
1980 .message
1990 EQUS "Loaded "
2000 .fname
2010 ]
2020 NEXT
2030 PRINT"Press any ke
y to save"
2040 IF GET
2050 *SAVE MREST 900+1F
F
```

See Archimedes Agora page 46

Listing 1. 256 mode colour selector

```
10 REM Agora - listing 1
20 REM ColourFind
30 REM by J de Boer
40 REM for Archimedes only
50 REM (c) BAU April 1989
60 :
70 MODE 15
80 ON ERROR VDU 20,26,12:PRINT REPORT
$" at line ";ERL:END
90 DIM rgb%(255),sum%(255),store%(15,
8,45)
100 red%=0
110 green%=0
120 blue%=0
130 FOR r%=-1 TO 1 STEP 2
140 FOR x%=0 TO 15
150 SYS "OS_ReadPalette",x%,16 TO ,,z%
160 IF r%<0 AND (red% OR green% OR blu
e%) THEN
170 i%=(red%+x%) MOD 4+(x% AND 4)
180 j%=(green%+x%) MOD 4
190 y%=(blue%+x%) MOD 4+(x% AND 8) DIV
 2
200 COLOUR x%,16*i%,16*j%,16*y%
210 ENDIF
220 z%=z%/16
230 FOR 1%=0 TO 2
240 z%=z%>>8
250 store%(x%,1%,0)=store%(x%,1%,0)+r%
*(z% AND &F)
260 NEXT
270 NEXT
280 NEXT
290 j%=255
300 h%=-255
310 y%=255
320 g%=-255
330 FOR x%=0 TO 255
340 i%=x% DIV 64
350 z%=FNcolpalreg(x%)
360 red%=store%(z%,0,0)+i%+4*(x% MOD 4
)
370 green%=store%(z%,1,0)+i%+(x% AND &
C)
380 blue%=store%(z%,2,0)+i%+((x% AND 4
8) DIV 4)
390 i%=(30+2*red%-green%-blue%)
400 IF y%>i% y%=i%
410 IF g%<i% g%=i%
420 z%=(15+green%-blue%) MOD 31
430 IF j%>z% j%=z%
440 IF h%<z% h%=z%
450 rgb%(x%)=blue%+16*(green%+16*red%)
460 sum%(x%)=z%+256*(i%+256*(x%+256*(r
ed%+green%+blue%)))
470 NEXT
480 store%()=-1
490 h%=480-16*(h%-j%)
500 c%=64-32*j%
510 g%=(60-g%-y%)*25/3
520 PROCsort(sum%(),0,255)
530 FOR x%=0 TO 255
540 i%=(sum%(x%)>>24) AND &FF
550 z%=(sum%(x%)>>16) AND &FF
560 1%=g%+16.67*((sum%(x%)>>8) AND &FF
)
570 r%=c%+32*(sum%(x%) AND &FF)
580 GCOL 0,z% MOD 64 TINT z%
590 CIRCLE FILL 1%+g%+276,r%+h%,(48-i%
)*1.838
600 1%=1% DIV 67
610 IF 1%<0 1%=0 ELSE IF 1%>15 1%=15
620 r%=r% DIV 128
630 IF r%<0 r%=0 ELSE IF r%>8 r%=8
640 store%(1%,r%,i%)=z%
650 NEXT
660 sum%()=0
670 sum%(255)=40
680 VDU 28,0,21,19,0
690 j%=0
700 MOUSE ON
710 MOUSE TO 776,546
720 OFF
730 *POINTER
740 REPEAT
750 MOUSE x%,y%,z%
760 IF x%>=256 PROCshades:r%=-1
770 IF x%<256 AND y%>(1023-j%) PROCcol
our
780 sum%(255)=-40*((sum%(255)=40) EOR
((z% AND 2)=2))
790 UNTIL FALSE
800 END
810 :
820 DEF PROCsort(s%(),1%,r%)
830 i%=1%
840 j%=r%
850 x%=s%((1%+r%) DIV 2)
860 REPEAT
870 WHILE s%(i%)<x%
```

Continued ▶

◀ 256 mode colour selector, continued

```
880 i%+=1
890 ENDWHILE
900 WHILE x%<s%(j%)
910 j%-=1
920 ENDWHILE
930 IF i%<=j% SWAP s%(i%),s%(j%):i%+=1:j%-=1
940 UNTIL i%>j%
950 IF l%<j% PROCsort(s%(),l%,j%)
960 IF i%<r% PROCsort(s%(),i%,r%)
970 ENDPROC
980 :
990 DEF PROCshades
1000 CLS
1010 PROCsweep
1020 x%=(x%-g%-284) DIV 67
1030 y%=(y%-h%) DIV 128
1040 IF y%<0 OR y%>8 OR (x% AND &FF0) ENDPROC
1050 PRINTTAB(0,0)
1060 j%=32
1070 green%=-1
1080 FOR r%=0 TO 45
1090 i%=store%(x%,y%,r%)
1100 red%=i% MOD 64
1110 IF i%<>-1 THEN
1120 j%+=32
1130 green%+=1
1140 PRINT"GC. ";CHR$(-32*(red%<10));red%;" TINT ";(i%AND&C0)
1150 GCOL 0,red% TINT i%
1160 RECTANGLE FILL 240,1023-j%,31
1170 sum%(green%)=i%
1180 ENDIF
1190 NEXT
1200 WHILE green%<15
1210 green%+=1
1220 sum%(green%)=0
1230 ENDWHILE
1240 REPEAT
1250 MOUSE x%,y%,z%
1260 UNTIL z% OR x%<240
1270 ENDPROC
1280 :
1290 DEF PROCcolour
1300 MOUSE x%,y%,z%
1310 y%=(992-y%) DIV 32
1320 red%=(j% DIV 32)-2
1330 IF y%=r% OR y%>red% OR y%<0 OR y%>15 ENDPROC ELSE r%=y%
1340 REM PRINTTAB(0,20)STRING$(15," ");
1350 l%=sum%(r%)
1360 y%=rgb%(l%)
1370 PRINTTAB(0,19)"COLOUR ";FNcolpalreg(l%);", "'(y%>>4) AND &F0;",";y% AND &F0;",";16*(y% AND &F);
1380 x%=l% MOD 64
1390 PROCsweep
1400 FOR green%=0 TO 2
1410 GCOL 1,x% AND 3*4^green% TINT l%
1420 WAIT
1430 CIRCLE FILL 200+(green%>0)*2*sum%(255),160+sum%(255)*(((green%+1) MOD 3)-1),119
1440 NEXT
1450 ENDPROC
1460 :
1470 DEF FNcolpalreg(l%)
1480 =(l% AND &10) DIV 2+4*(l% AND 1)+l% DIV 64
1490 :
1500 DEF PROCsweep
1510 GCOL 0,0 TINT 0
1520 WAIT
1530 CIRCLE FILL 160,160,179
1540 ENDPROC
```

Listing 2. Compare utility

```
10 REM Agora - listing 2
20 REM File Comparer
30 REM by E Spier
40 REM for Archimedes only
50 REM (c) BAU April 1989
60 :
70 DIM code% 1000
80 stringlen=10
90 FOR pass=0 TO 3 STEP 3
100 P%=code%
110 [OPT pass
120 STMFD R13!,{R14}
130 MOV R7,R1
140 SUB R1,R1,#1
150 .loop1
160 LDRB R2,[R1,#1]!
170 CMP R2,#0
180 BEQ syntaxerror
190 CMP R2,#ASC" "
200 BNE loop1
210 MOV R2,#0
220 STRB R2,[R1]
230 ADD R1,R1,#1
240 MOV R8,R1
250 MOV R0,#&40
260 SWI "XOS_Find"
270 MOV R10,R0
280 MOV R0,#&40
290 MOV R1,R7
300 SWI "XOS_Find"
310 MOV R9,R0
320 CMP R9,#0
330 BEQ badname
340 CMP R10,#0
350 BEQ badname
360 MOV R0,R7
370 SWI "XOS_Write0"
380 ADR R0,lengthtext
390 SWI "XOS_Write0"
400 MOV R0,#5
410 MOV R1,R7
420 SWI "XOS_File"
430 MOV R0,R4
440 FNprintdec
450 SWI "XOS_NewLine"
460 MOV R0,R8
470 SWI "XOS_Write0"
480 ADR R0,lengthtext
490 SWI "XOS_Write0"
500 MOV R0,#5
510 MOV R1,R8
520 SWI "XOS_File"
530 MOV R0,R4
540 FNprintdec
550 SWI "XOS_NewLine"
560 MOV R11,#0
570 .loop2
580 MOV R1,R9
590 SWIS "XOS_BGet"
600 BCS end
610 MOV R12,R0
620 MOV R1,R10
630 SWIS "XOS_BGet"
640 BCS end
650 CMP R0,R12
660 ADDNE R11,R11,#1
670 B loop2
680 .end
690 MOV R0,#0
700 MOV R1,#0
710 SWI "XOS_Find"
720 MOV R0,R11
730 FNprintdec
740 SWI "XOS_WriteS"
750 EQUS " differences between the files."
760 EQUB 13
770 EQUB 10
780 EQUB 0
790 ALIGN
800 LDMFD R13!,{R15}
810 .syntaxerror
820 SWI "XOS_WriteS"
830 EQUS "Syntax: COMPARE <file1> <file2>"
840 EQUB 13
850 EQUB 10
860 EQUB 0
870 ALIGN
880 LDMFD R13!,{R15}
890 .badname
900 MOV R0,#0
910 MOV R1,#0
920 SWI "XOS_Find"
930 SWI "XOS_WriteS"
940 EQUS "No such file."
950 EQUB 13
960 EQUB 10
970 EQUB 0
980 ALIGN
990 LDMFD R13!,{R15}
1000 .lengthtext
1010 EQUS " has a byte length of "
1020 EQUB 0
1030 ALIGN
1040 .string
1050 EQUS STRING$(stringlen,CHR$ 0)
1060 ]
1070 NEXT
1080 SYS "OS_File",10,"%.Compare",&FFC,,code%,P%
1090 PRINT"*Compare <File1> <File2> has been saved in the library"
1100 END
1110 :
1120 DEF FNprintdec
1130 [OPT pass
1140 ADR R1,string
1150 MOV R2,#stringlen
1160 SWI "XOS_BinaryToDecimal"
1170 ADR R0,string
1180 MOV R3,#0
1190 STRB R3,[R0,R2]
1200 SWI "XOS_Write0"
1210 ]
1220 =""
```

See Rites of Spring page 81

```
   10 REM >List1
   20 REM Runemaker - Codename: Druid
   30 REM By Chris Rusemean
   40 REM For BBC B/B+/M/C
   50 REM (C) BBC Acorn User
   60 :
   70 IF PAGE<>&3200 THEN PAGE=&3200:CHAIN"List1"
   80 L%=&6500
   90 MODE 7:LOMEM=L%
  100 :
  110 xpos=&00
  120 ypos=&05
  130 exists=&0A
  140 oldxpos=&0F
  150 oldypos=&14
  160 dx=&19
  170 dy=&1E
  180 image=&23
  190 ismoving=&28
  200 flippers=&2D
  210 dying=&32
  220 rd=&37
  230 clouds=&3C
  240 eggs=&4C
  250 why=&4D
  260 val=&4E
  270 :
  280 misx=&50
  290 misy=&51
  300 misdx=&52
  310 misdy=&53
  320 misad=&54
  330 light=&56
  340 ench=&57
  350 time=&58
  360 round=&59
  370 energy=&5A
  380 gbyte=&5B
  390 tmp=&5C
  400 addr=&5D
  410 zapx=&5F
  420 zapy=&60
  430 zapdx=&61
  440 zapdy=&62
  450 zdx=&63
  460 zdy=&64
  470 zcount=&65
  480 hiscore=&66
  490 assem=&68
  500 volts=&69
  510 oar=&6A
  520 order=&6B
  530 base=&6C
  540 vect=&6E
  550 write=&70
  560 write2=&72
  570 read=&74
  580 scrn=&76
  590 bits=&77
  600 lives=&78
  610 rdone=&79
  620 y=&7A
  630 ux=&7B
  640 uy=&7C
  650 tick=&7D
  660 handy=&7E
  670 who=&7F
  680 presy=&80
  690 it=&81
  700 byte=&82
  710 counta=&83
  720 countb=&84
  730 dep=&85
  740 counter=&86
  750 rgot=&87
  760 smask=&88
  770 facing=&89
  780 score=&8A
  790 Spare=&8C-&8F
  800 :
  810 rdata=&A8
  820 nasties=&A8
  830 runes=&A9
  840 bonii=&AA
  850 candela=&AB
  860 rmask=&AC
  870 upprob=&AD
  880 fbase=&AE
  890 zbase=&AF
  900 :
  910 div12%=&100
  920 newtab=&180
  930 spra%=&400
  940 runex%=&7C0
  950 rscrn%=&880
  960 sdat%=&900
  970 runey%=&CC0
  980 hideout=&D01
  990 final%=&E01
 1000 :
 1010 canspr=0
 1020 ebase=&3000+5*&280+8
 1030 maxen=78
 1040 :
 1050 osword=&FFF1
 1060 osbyte=&FFF4
 1070 osrdch=&FFE0
 1080 oswrch=&FFEE
 1090 :
 1091 PRINT"Assembling code..."
 1100 pass%=0
 1110 FOR Z%=0 TO &7D:Z%?&900=Z%?&482:NEXT
 1120 ?&97E=?2:?&97F=?3
 1130 CHAIN "List2"
```

```
   10 REM >List2
   20 REM Runemaker - Codename: Druid
   30 REM By Chris Rusemean
   40 REM For BBC B/B+/M/C
   50 REM (C) BBC Acorn User
   60 :
   70 LOMEM=L%
   80 FOR Z%=0 TO &7D:Z%?&482=Z%?&900:NEXT
   90 ?2=?&97E:?3=?&97F
  100 :
  110 P%=final%
  120 :
  130 PRINTCHR$13;"  Listing 2, pass ";pass%;
  140 sprb%=P%:P%=P%+&BF4
  150 depths%=sprb%+&B40
  160 [OPT pass%
  170 .gameloop
  180 LDA #6
  190 JSR showmess
  200 JSR makecan
  210 .wfs
  220 LDX #256-99
  230 JSR inkey
  240 BNE wfs
  250 LDA #3
  260 STA lives
  270 LDX #0
  280 LDY #5
  290 JSR spr
  300 LDX #1
  310 LDY #4
  320 JSR spr
  330 LDX #0
  340 STX round
  350 STX score
  360 STX score+1
  370 INX
  380 STX dx
  390 INX
  400 STX facing
  410 STX image
  420 STX xpos
  430 LDA #240
  440 STA ypos
  450 LDY #15
  460 .setclouds
  470 JSR rand
  480 AND #128+31
  490 CLC
  500 ADC #14
  510 STA clouds,Y
  520 DEY
  530 BPL setclouds
  540 JSR rand
  550 AND #15
  560 STA scrn
  570 JSR showscore
  580 JSR initen
  590 .roundloop
  600 LDA #&B0
  610 STA write
  620 LDA #&39
  630 STA write+1
  640 LDX round
  650 INX
  660 LDY #0
  670 JSR dec
  680 LDA round
  690 AND #7
  700 ASL A
  710 ASL A
  720 ASL A
  730 TAX
  740 LDY #0
  750 .build
  760 LDA rounds,X
  770 STA rdata,Y
  780 INX
  790 INY
  800 CPY #8
  810 BNE build
  820 LDA #&3F
  830 STA smask
  840 LDX #0
  850 STX rgot
  860 STX light
  870 STX ismoving
  880 STX exists
  890 STX dy
  900 STX volts
  910 LDY #15
  920 .clrtab
  930 LDA #255
  940 STA rpos%,Y
  950 TXA
  960 STA newtab,Y
  970 STA newtab+16,Y
  980 DEY
  990 BPL clrtab
 1000 TAY
 1010 .setdef
 1020 LDX #0
 1030 TYA
 1040 AND #3
 1050 CMP #3
 1060 BNE not3
 1070 LDX #&10
 1080 .not3
 1090 TXA
 1100 STA hideout,Y
 1110 INY
 1120 BNE setdef
 1130 LDA runes
 1140 STA rdone
 1150 STA it
 1160 .initrunes
 1170 LDA it
 1180 JSR makerune
 1190 DEC it
 1200 BNE initrunes
 1210 LDX #7
 1220 STX it
 1230 .clrcumen
 1240 LDX it
 1250 JSR showrune
 1260 DEC it
 1270 BNE clrcumen
 1280 LDA bonii
 1290 STA it
 1300 .lunch
 1310 JSR makeburg
 1320 DEC it
 1330 BNE lunch
 1340 JSR makecan
 1350 LDA candela
 1360 LDX #0
 1370 JSR burnto
 1380 .screenloop
 1390 JSR cnorm
 1400 JSR setup
 1410 LDA #255
 1420 STA misx
 1430 .playloop
 1440 LDX #256-106
 1450 JSR inkey
 1460 BNE nopaws
 1470 JSR cnorm
 1480 .paws
 1490 LDX #256-90
 1500 JSR inkey
 1510 BNE paws
 1520 .nopaws
 1530 LDX #256-82
 1540 JSR inkey
 1550 BNE nots
 1560 LDX #0
 1570 BEQ dofx
 1580 .nots
 1590 LDX #256-17
 1600 JSR inkey
 1610 BNE notq
 1620 LDX #1
 1630 .dofx
 1640 LDY #0
 1650 LDA #210
 1660 JSR osbyte
 1670 .notq
 1680 JSR fx19
 1690 JSR rand
 1700 AND #15
 1710 BNE nocr
 1720 JSR create
 1730 .nocr
 1740 INC tick
 1750 LDX #95
 1760 .cleardone
 1770 LDA screen%,X
 1780 AND #127
 1790 STA screen%,X
 1800 DEX
 1810 BPL cleardone
 1820 LDA dying
 1830 BNE ohdear
 1840 LDA #3
 1850 STA tmp
 1860 .joules
 1870 LDA ench
 1880 BEQ norech
 1890 BMI isdisch
 1900 DEC ench
 1910 JSR recharge
 1920 JMP norech
 1930 .isdisch
 1940 INC ench
 1950 JSR discharge
 1960 .norech
 1970 DEC tmp
 1980 BNE joules
 1990 .ohdear
 2000 JSR rand
 2010 CMP upprob
 2020 BCC enterprise
 2030 LDX volts
 2040 INX
 2050 BNE nonz
 2060 DEX
 2070 .nonz
 2080 STX volts
 2090 CPX zbase
 2100 BCC uncooked
 2110 JSR rand
 2120 AND #3
 2130 BNE uncooked
 2140 JSR sprong
 2150 JSR rand
 2160 AND #3
 2170 BEQ enterprise
 2180 LDA #0
 2190 STA volts
 2200 BEQ enterprise
 2210 .uncooked
 2220 CPX fbase
 2230 BCC enterprise
 2240 JSR rand
 2250 AND #31
 2260 BNE enterprise
 2270 JSR flashit
 2280 LDA #32
 2290 JSR sound2
 2300 .enterprise
 2310 JSR fx19
 2320 LDY light
 2330 BEQ nodec
 2340 DEC light
 2350 .nodec
 2360 LDX cyanseq,Y
 2370 JSR vdu19
 2380 LDX redseq,Y
 2390 JSR vdu19
 2400 LDY #15
 2410 .twinkle
 2420 JSR rand
 2430 ORA #128
 2440 AND #&F7
 2450 JSR vdu19a
 2460 DEY
 2470 BPL twinkle
 2480 JSR fx19
 2490 SEI
 2500 LDA nasties
 2510 STA who
```

Continued▶

◀ **Rites of Spring, listing 2 continued**

```
2520 .unstloop
2530 LDX who
2540 LDA exists,X
2550 CMP #254
2560 BCC alive
2570 BNE nextunst
2580 INC exists,X
2590 BNE nextset
2600 .alive
2610 TAY
2620 LDA ismoving,X
2630 AND #128
2640 BEQ setflip
2650 LDA flipwhen,Y
2660 AND tick
2670 BNE nextset
2680 LDA flippers,X
2690 EOR #1
2700 .setflip
2710 STA flippers,X
2720 .nextset
2730 LDY oldypos,X
2740 LDA oldxpos,X
2750 TAX
2760 JSR wipeout
2770 LDX who
2780 JSR updateold
2790 .nextunst
2800 DEC who
2810 BPL unstloop
2820 LDA #0
2830 STA order
2840 .orderloop
2850 LDA nasties
2860 STA who
2870 .stloop
2880 LDX who
2890 LDA exists,X
2900 CMP order
2910 BNE bother
2920 LDA dying,X
2930 BEQ notdead
2940 DEC dying,X
2950 BEQ snuffedit
2960 LDA tick
2970 AND #1
2980 BEQ notdead
2990 .bother
3000 JMP nextst
3010 .snuffedit
3020 LDA #255
3030 STA exists,X
3040 BNE bother
3050 .notdead
3060 LDA image,X
3070 EOR flippers,X
3080 TAY
3090 LDA lospt%,Y
3100 STA read
3110 LDA hispt%,Y
3120 STA read+1
3130 JSR preca
3140 LDA countb
3150 EOR #7
3160 STA counta
3170 .rowloop
3180 ]
3190 PROCa(write,write2
,640-8)
3200 [OPT pass%
3210 LDA #5
3220 STA counter
3230 .columnloop
3240 LDX counta
3250 .loopa
3260 LDA (read),Y
3270 CMP #64
3280 BCC nomask
3290 BMI ignore
3300 STA byte
3310 CMP #128
3320 BCC andr
3330 LDA #&AA
3340 BNE doand
3350 .andr
3360 LDA #&55
3370 .doand
3380 AND (write),Y
3390 ORA byte
3400 AND #&3F
3410 .nomask
3420 STA (write),Y
3430 .ignore
3440 INY
3450 DEX
3460 BPL loopa
3470 LDX countb
3480 BEQ noloopb
3490 .loopb
3500 LDA (read),Y
3510 CMP #64
3520 BCC nomaskb
3530 BMI ignoreb
3540 STA byte
3550 CMP #128
3560 BCC andrb
3570 LDA #&AA
3580 BNE doandb
3590 .andrb
3600 LDA #&55
3610 .doandb
3620 AND (write2),Y
3630 ORA byte
3640 AND #&3F
3650 .nomaskb
3660 STA (write2),Y
3670 .ignoreb
3680 INY
3690 DEX
3700 BNE loopb
3710 .noloopb
3720 DEC counter
3730 BNE columnloop
3740 ]
3750 PROCa(write,write
640-40)
3760 [OPT pass%
3770 CPY #80
3780 BNE rowloop
3790 .nextst
3800 DEC who
3810 BMI bmi
3820 JMP stloop
3830 .bmi
3840 INC order
3850 LDA order
3860 CMP #5
3870 BEQ beq
3880 JMP orderloop
3890 .beq
3900 LDA tick
3910 AND #3
3920 BNE nocloud
3930 JSR cloudy
3940 LDX scrn
3950 LDY clouds,X
3960 BMI cloudr
3970 DEY
3980 BEQ rev
3990 BNE zloty
4000 .cloudr
4010 INY
4020 CPY #128+60
4030 BNE zloty
4040 .rev
4050 TYA
4060 EOR #128
4070 TAY
4080 .zloty
4090 STY clouds,X
4100 .nocloud
4110 LDA tick
4120 AND #63
4130 BNE noinc
4140 INC time
4150 .noinc
4160 JSR showcan
4170 LDX misx
4180 BMI nospell
4190 JSR wipespell
4200 LDA misx
4210 CLC
4220 ADC misdx
4230 STA misx
4240 CMP #71
4250 BCS deadspell
4260 LDA misy
4270 CLC
4280 ADC misdy
4290 STA misy
4300 ADC #1
4310 CMP #32
4320 BCC deadspell
4330 JSR rand
4340 AND #63
4350 ORA #192
4360 STA warble
4370 LDA #12
4380 JSR sound
4390 LDA nasties
4400 STA tmp
4410 .zaploop
4420 LDX misx
4430 LDY misy
4440 LDA tmp
4450 JSR collide
4460 BCS nozap
4470 JSR gotone
4480 LDY exists,X
4490 LDA points,Y
4500 JSR addsc
4510 .deadspell
4520 LDA #255
4530 STA misx
4540 BNE nospell
4550 .nozap
4560 DEC tmp
4570 BNE zaploop
4580 BIT misx
4590 BMI nospell
4600 JSR showspell
4610 INC misdy
4620 .nospell
4630 LDY scrn
4640 LDX rpos%,Y
4650 BPL isrune
4660 JMP norune
4670 .isrune
4680 LDA rtype%,Y
4690 JSR calcrune
4700 LDA runex%,X
4710 CLC
4720 ADC #3
4730 SEC
4740 SBC xpos
4750 CMP #8
4760 BCS nottaken
4770 LDA runey%,X
4780 CLC
4790 ADC #7
4800 SEC
4810 SBC ypos
4820 CMP #23
4830 BCS nottaken
4840 LDA #255
4850 STA rpos%,Y
4860 LDA runex%,X
4870 STA ux
4880 LDA runey%,X
4890 STA uy
4900 LDA rtype%,Y
4910 BNE arune
4920 JSR rand
4930 AND #7
4940 ORA #8
4950 JSR adden
4960 JSR makeburg
4970 JMP remove
4980 .arune
4990 TAX
5000 JSR cumen
5010 LDX rdone
5020 CPX #7
5030 BEQ nomore
5040 INX
5050 STX rdone
5060 TXA
5070 JSR makerune
5080 .nomore
5090 INC rgot
5100 LDA rgot
5110 CMP #7
5120 BNE notlast
5130 LDA #0
5140 STA assem
5150 .notlast
5160 LDA #21
5170 JSR addsc
5180 LDA #16
5190 JSR sound2
5200 .remove
5210 LDX ux
5220 LDY uy
5230 JSR wipeout
5240 JSR arrows
5250 JMP norune
5260 .nottaken
5270 LDA rtype%,Y
5280 BEQ burger
5290 LDA rmask
5300 STA smask
5310 .burger
5320 LDY runey%,X
5330 LDA runex%,X
5340 TAX
5350 LDA #4
5360 JSR show
5370 .norune
5380 LDA #&3F
5390 STA smask
5400 LDA nasties
5410 STA who
5420 .movloop
5430 LDX who
5440 LDY exists,X
5450 BMI nextmov
5460 LDA dying,X
5470 BNE nextmov
5480 LDA movewhen,Y
5490 AND tick
5500 BNE nextmov
5510 TYA
5520 ASL A
5530 TAY
5540 LDA typetab,Y
5550 STA vect
5560 LDA typetab+1,Y
5570 STA vect+1
5580 LDY ypos,X
5590 LDA xpos,X
5600 TAX
5610 JSR hfd
5620 STA dep
5630 LDX who
5640 LDA ismoving,X
5650 BEQ nomovex
5660 LDA xpos,X
5670 CLC
5680 ADC dx,X
5690 STA xpos,X
5700 .nomovex
5710 LDA dy,X
5720 BMI inair
5730 LDA ypos,X
5740 CMP dep
5750 BNE inair
5760 LDA #0
5770 STA dy,X
5780 BEQ service
5790 .inair
5800 LDA ypos,X
5810 CLC
5820 ADC dy,X
5830 INC dy,X
5840 CMP dep
5850 BCC canfall
5860 CPX #0
5870 BNE isnt
5880 LDA #9
5890 SEC
5900 SBC dy,X
5910 BCS isnt
5920 JSR adden
5930 .isnt
5940 LDA dep
5950 .canfall
5960 STA ypos,X
5970 .service
5980 LDA xpos,X
5990 BEQ jsrind
6000 CMP #67
6010 .jsrind
6020 JSR indir
6030 LDX who
6040 .nextmov
6050 CPX #0
6060 BEQ nice
6070 LDY exists,X
6080 BMI nice
6090 LDA xpos,X
6100 CLC
6110 ADC #4
6120 SEC
6130 SBC xpos
6140 CMP #9
6150 BCS nice
6160 LDA ypos,X
6170 CLC
6180 ADC #16
6190 SEC
6200 SBC ypos
6210 CMP heightof,Y
6220 BCS nice
6230 LDA #256-3
6240 JSR adden
6250 .nice
6260 DEC who
6270 BMI donemovloop
6280 JMP movloop
6290 .donemovloop
```

Continued ▶

◀ **Rites of Spring, listing 2 continued**

```
6300 LDA #15
6310 LDX xpos
6320 BEQ newscr
6330 CPX #67
6340 BNE cont
6350 LDA #1
6360 .newscr
6370 PHA
6380 TXA
6390 EOR #66
6400 STA xpos
6410 JSR storenasties
6420 PLA
6430 CLC
6440 ADC scrn
6450 AND #15
6460 STA scrn
6470 JMP screenloop
6480 .cont
6490 LDA rgot
6500 CMP #7
6510 BNE notaltar
6520 LDA scrn
6530 CMP #3
6540 BNE notaltar
6550 CPX #33
6560 BCC notaltar
6570 CPX #37
6580 BCS notaltar
6590 LDA ypos
6600 CMP #209
6610 BNE notaltar
6620 LDA assem
6630 STA apitch
6640 LDA #48
6650 JSR sound
6660 INC assem
6670 LDA assem
6680 AND #31
6690 BNE notaltar
6700 LDA assem
6710 LSR A
6720 LSR A
6730 LSR A
6740 LSR A
6750 LSR A
6760 TAX
6770 JSR calcrune
6780 LDA ccol,X
6790 JSR colcumen
6800 LDA assem
6810 CMP #&E0
6820 BNE notaltar
6830 JSR cnorm
6840 LDA round
6850 AND #7
6860 TAX
6870 INX
6880 INC round
6890 LDA #232
6900 JSR burnto
6910 JMP roundloop
6920 .notaltar
6930 BIT &FF
6940 BMI ouch
6950 LDA dying
6960 CMP #1
6970 BEQ ouch
6980 BCS withus
6990 LDX energy
7000 BNE withus
7010 JSR gotone
7020 .timeok
7030 JMP playloop
7040 .withus
7050 LDA time
7060 CMP #232
7070 BCC timeok
7080 LDX #1
7090 STX lives
7100 JSR delspr
7110 LDX #0
7120 JSR delspr
7130 .ouch
7140 LDA energy
7150 BEQ zero
7160 JSR discharge
7170 JMP ouch
7180 .zero
7190 LDA #126
7200 JSR osbyte
7210 DEC lives
7220 BEQ isdead
7230 LDX lives
7240 DEX
7250 BMI noshow
7260 JSR delspr
7270 .noshow
7280 JSR initen
7290 JMP playloop
7300 .isdead
7310 JSR cnorm
7320 LDA score+1
7330 CMP hiscore+1
7340 BCC nhs
7350 BNE ishs
7360 LDA score
7370 CMP hiscore
7380 BCC nhs
7390 BEQ nhs
7400 .ishs
7410 LDA score
7420 STA hiscore
7430 LDA score+1
7440 STA hiscore+1
7450 LDA #21
7460 JSR showmess
7470 LDA #15
7480 JSR osbyte
7490 LDY #0
7500 .gnloop
7510 LDA #ASC"?"
7520 JSR oswrch
7530 JSR osrdch
7540 PHP
7550 PHA
7560 LDA #127
7570 JSR oswrch
7580 PLA
7590 PLP
7600 BCS pret
7610 CMP #13
7620 BEQ pret
7630 CMP #32
7640 BCC gnloop
7650 CMP #127
7660 BEQ isdel
7670 BCS gnloop
7680 CPY #15
7690 BEQ gnloop
7700 STA hiname,Y
7710 INY
7720 .dodel
7730 JSR oswrch
7740 JMP gnloop
7750 .isdel
7760 CPY #0
7770 BEQ gnloop
7780 DEY
7790 BPL dodel
7800 .pret
7810 CPY #15
7820 BEQ nhs
7830 LDA #32
7840 STA hiname,Y
7850 INY
7860 BPL pret
7870 .nhs
7880 JMP gameloop
7890 ]
7900 :
7910 FOR Z%=0 TO &7D:Z%?&900=Z%?&482:NEXT
7920 ?&97E=?2:?&97F=?3
7930 CHAIN "List3"
7940 :
7950 DEF PROCa(zp1,zp2,val%)
7960 [OPT pass%
7970 LDA zp1
7980 CLC
7990 ADC #val% MOD 256
8000 STA zp2
8010 LDA zp1+1
8020 ADC #val% DIV 256
8030 STA zp2+1
8040 ]
8050 ENDPROC


  10 REM >List3
  20 REM Runemaker - Codename: Druid
  30 REM By Chris Ruseman
  40 REM For BBC B/B+/M/C
  50 REM (C) BBC Acorn USer
  60 :
  70 LOMEM=L%
  80 FOR Z%=0 TO &7D:Z%?&482=Z%?&900:NEXT
  90 ?2=?&97E:?3=?&97F
 100 :
 110 PRINTCHR$13;" Listing 3, pass ";pass%;
 120 [OPT pass%
 130 .initen
 140 LDA #0
 150 STA dying
 160 STA energy
 170 LDA #maxen
 180 STA ench
 190 RTS
 200 :
 210 .collide
 220 STX ux
 230 STY uy
 240 TAX
 250 LDY exists,X
 260 BMI gobacks
 270 LDA dying,X
 280 BNE gobacks
 290 LDA ux
 300 SEC
 310 SBC xpos,X
 320 CMP #4
 330 BCS goback
 340 LDA ypos,X
 350 CLC
 360 ADC #15
 370 SEC
 380 SBC uy
 390 CMP size,Y
 400 .goback
 410 RTS
 420 .gobacks
 430 SEC
 440 RTS
 450 :
 460 .makeburg
 470 LDA #0
 480 .makerune
 490 PHA
 500 .trymakerune
 510 JSR rand
 520 AND #63
 530 TAX
 540 LDY rscrn%,X
 550 CPY scrn
 560 BEQ trymakerune
 570 LDA rpos%,Y
 580 BPL trymakerune
 590 TXA
 600 STA rpos%,Y
 610 PLA
 620 STA rtype%,Y
 630 RTS
 640 :
 650 .cloudy
 660 LDA #ctop MOD 256
 670 STA read
 680 LDA #ctop DIV 256
 690 STA read+1
 700 LDY #80
 710 JSR cloudsub
 720 LDA #cbot MOD 256
 730 STA read
 740 LDA #cbot DIV 256
 750 STA read+1
 760 LDY #88
 770 .cloudsub
 780 LDX scrn
 790 LDA clouds,X
 800 AND #127
 810 TAX
 820 LDA #12
 830 JMP show
 840 :
 850 .adden
 860 CLC
 870 ADC ench
 880 STA ench
 890 RTS
 900 :
 910 .recharge
 920 LDA energy
 930 CMP #maxen
 940 BEQ nomoreen
 950 LDX #1
 960 JSR showen
 970 INC energy
 980 .nomoreen
 990 RTS
1000 :
1010 .discharge
1020 LDA energy
1030 BEQ verytired
1040 DEC energy
1050 LDX #0
1060 .showen
1070 LDA #0
1080 STA write+1
1090 LDA energy
1100 ASL A
1110 ASL A
1120 ROL write+1
1130 ASL A
1140 ROL write+1
1150 ADC #ebase MOD 256
1160 STA write
1170 LDA write+1
1180 ADC #ebase DIV 256
1190 STA write+1
1200 LDY #6
1210 .enloop
1220 LDA endata,X
1230 CPX #0
1240 BEQ noinx
1250 INX
1260 .noinx
1270 STA (write),Y
1280 DEY
1290 BNE enloop
1300 .verytired
1310 LDA energy
1320 ASL A
1330 STA epitch
1340 LDA #28
1350 JMP sound
1360 :
1370 .calcrune
1380 ASL A
1390 ASL A
1400 ASL A
1410 ASL A
1420 ASL A
1430 ADC #bonus MOD 256
1440 STA read
1450 LDA #bonus DIV 256
1460 ADC #0
1470 STA read+1
1480 RTS
1490 :
1500 .colcumen
1510 STA smask
1520 .cumen
1530 STX tmp
1540 LDY #31
1550 .crune
1560 LDA (read),Y
1570 AND #3
1580 TAX
1590 LDA dtab,X
1600 STA newtab,Y
1610 DEY
1620 BPL crune
1630 LDX tmp
1640 JSR showrune
1650 LDA #&3F
1660 STA smask
1670 RTS
1680 :
1690 .burnto
1700 STA tmp
1710 STX handy
1720 .bloop
1730 LDA tmp
1740 CMP time
1750 BNE burn
1760 RTS
1770 .burn
1780 INC time
1790 JSR fx19
1800 JSR showcan
1810 LDA handy
1820 JSR addsc
1830 JMP bloop
1840 :
1850 .showrune
1860 LDA #newtab MOD 256
1870 STA read
1880 LDA #newtab DIV 256
1890 STA read+1
1900 LDY rposy,X
1910 LDA rposx,X
1920 TAX
```

Continued ▶

◀ Rites of Spring, listing 3 continued

```
1930 LDA #4
1940 BNE show
1950 :
1960 .makecan
1970 LDA #240
1980 .buildcan
1990 PHA
2000 TAY
2010 LDA #0
2020 JSR mainshowcan
2030 PLA
2040 SEC
2050 SBC #8
2060 CMP #80
2070 BNE buildcan
2080 STA time
2090 .showcan
2100 LDY time
2110 JSR rand
2120 AND #1
2130 CLC
2140 ADC #2
2150 JSR mainshowcan
2160 LDA time
2170 CLC
2180 ADC #8
2190 TAY
2200 LDA #1
2210 .mainshowcan
2220 ASL A
2230 TAX
2240 LDA cans,X
2250 STA read
2260 LDA cans+1,X
2270 STA read+1
2280 LDA #6
2290 LDX #74
2300 .show
2310 STA counter
2320 JSR calcaddr
2330 LDA countb
2340 EOR #7
2350 STA counta
2360 ]
2370 PROCa(write,write2
,640-8)
2380 [OPT pass%
2390 .show2
2400 LDX counta
2410 .show2a
2420 LDA (read),Y
2430 AND smask
2440 STA (write),Y
2450 INY
2460 DEX
2470 BPL show2a
2480 LDX countb
2490 BEQ noshow2b
2500 .show2b
2510 LDA (read),Y
2520 AND smask
2530 STA (write2),Y
2540 INY
2550 DEX
2560 BNE show2b
2570 .noshow2b
2580 DEC counter
2590 BNE show2
2600 RTS
2610 :
2620 .delspr
2630 LDA #0
2640 BEQ mainspr
2650 .spr
2660 LDA #&3F
2670 .mainspr
2680 STA tmp
2690 LDA losp%,Y
2700 STA read
2710 LDA hisp%,Y
2720 STA read+1
2730 LDA lposl,X
2740 STA write
2750 LDA lposh,X
2760 STA write+1
2770 LDY #0
2780 .spr1
2790 LDX #40
2800 .spr2
2810 LDA (read),Y
2820 AND tmp
2830 STA (write),Y
2840 INY
2850 DEX
2860 BNE spr2
2870 ]PROCa(write,write
,640-40)
2880 [OPT pass%
2890 CPY #40
2900 BEQ spr1
2910 RTS
2920 :
2930 .indir
2940 JMP (vect)
2950 :
2960 .fx19
2970 LDA #19
2980 JMP osbyte
2990 :
3000 .cnorm
3010 CLI
3020 .norm
3030 LDY #2
3040 .nloop
3050 LDX defcol,Y
3060 JSR vdu19
3070 DEY
3080 BPL nloop
3090 RTS
3100 :
3110 .sprong
3120 JSR norm
3130 JSR rand
3140 AND #2
3150 SEC
3160 SBC #1
3170 STA zdx
3180 JSR rand
3190 AND #15
3200 CLC
3210 ADC #10
3220 STA zdy
3230 LDA #2
3240 STA tmp
3250 LDA #16
3260 STA zcount
3270 LDA #0
3280 JSR sound2
3290 .berlin
3300 LDX scrn
3310 LDA clouds,X
3320 AND #127
3330 CLC
3340 ADC #6
3350 STA zapx
3360 LDA #96
3370 STA zapy
3380 LDA zdx
3390 STA zapdx
3400 LDA zdy
3410 STA zapdy
3420 .monkey
3430 DEC zcount
3440 BNE nofx19
3450 JSR fx19
3460 LDA #16
3470 STA zcount
3480 .nofx19
3490 LDX zapx
3500 LDY zapy
3510 JSR calcaddr
3520 LDA (write),Y
3530 AND #&3F
3540 CMP #60
3550 BNE hitsummit
3560 LDA (write),Y
3570 EOR #&C0
3580 STA (write),Y
3590 JSR nextpnt
3600 BCC monkey
3610 .hitsummit
3620 DEC tmp
3630 BNE berlin
3640 LDA #0
3650 JSR sound2
3660 LDA #2
3670 STA counter
3680 .twoloops
3690 JSR nextpnt
3700 BCS flashit
3710 LDA nasties
3720 STA tmp
3730 .colin
3740 LDX zapx
3750 LDY zapy
3760 LDA tmp
3770 JSR collide
3780 BCS notcolin
3790 LDX tmp
3800 BEQ mrdruid
3810 JSR gotone
3820 .notcolin
3830 DEC tmp
3840 BPL colin
3850 DEC counter
3860 BNE twoloops
3870 BEQ flashit
3880 .mrdruid
3890 LDA #256-32
3900 JSR adden
3910 .flashit
3920 LDA #7
3930 STA light
3940 RTS
3950 :
3960 .nextpnt
3970 CLC
3980 INC zapy
3990 DEC zapdy
4000 BNE nodx
4010 LDA zdy
4020 STA zapdy
4030 LDA zapx
4040 CLC
4050 ADC zapdx
4060 STA zapx
4070 CMP #72
4080 .nodx
4090 RTS
4100 ]
4110 :
4120 FOR Z%=0 TO &7D:Z%
?&900=Z%?&482:NEXT
4130 ?&97E=?2:?&97F=?3
4140 CHAIN "List4"
4150 :
4160 DEF PROCa(zp1,zp2,
val%)
4170 [OPT pass%
4180 LDA zp1
4190 CLC
4200 ADC #val% MOD 256
4210 STA zp2
4220 LDA zp1+1
4230 ADC #val% DIV 256
4240 STA zp2+1
4250 ]
4260 ENDPROC
```

```
10 REM >List4
20 REM Runemaker - Co
dename: Druid
30 REM By Chris Rusem
an
40 REM For BBC B/B+/M
/C
50 REM (C) BBC Acorn
User
60 :
70 LOMEM=L%
80 FOR Z%=0 TO &7D:Z%
?&482=Z%?&900:NEXT
90 ?2=?&97E:?3=?&97F
100 :
110 PRINTCHR$13;"  Lis
ting 4, pass ";pass%;
120 [OPT pass%
130 .dodruid
140 LDX #256-74
150 JSR inkey
160 BNE nofire
170 BIT misx
180 BPL nofire
190 LDA energy
200 CMP #1
210 BEQ nofire
220 LDA ypos
230 CLC
240 ADC #8
250 STA misy
260 LDA facing
270 ASL A
280 CLC
290 ADC xpos
300 STA misx
310 LDA #250
320 STA misdy
330 LDA facing
340 ASL A
350 SEC
360 SBC #2
370 STA misdx
380 LDA #255
390 JSR adden
400 JSR showspell
410 .nofire
420 LDA #1
430 STA exists
440 STA ismoving
450 LDA facing
460 STA image
470 BIT dy
480 BPL falling
490 LDA #255
500 STA dep
510 .stophere
520 RTS
530 .falling
540 LDA image
550 EOR #1
560 STA image
570 LDA ypos
580 CMP dep
590 BNE stophere
600 .dontfall
610 LDX #0
620 STX dy
630 STX it
640 DEX
650 STX ismoving
660 LDX #256-67
670 JSR inkey
680 BNE notfor
690 LDX #1
700 STX dx
710 INX
720 STX facing
730 STX it
740 .notfor
750 LDX #256-98
760 JSR inkey
770 BNE notback
780 LDA xpos
790 BEQ notback
800 LDX #0
810 STX facing
820 DEX
830 STX dx
840 STX it
850 .notback
860 LDA facing
870 STA image
880 LDX #256-73
890 JSR inkey
900 BNE nojump
910 LDA #250
920 STA dy
930 LDA #1
940 STA ismoving
950 LDA it
960 BNE active
970 STA dx
980 .nojump
990 LDA it
1000 BNE active
1010 STA exists
1020 STA ismoving
1030 LDA facing
1040 LSR A
1050 ADC #4
1060 STA image
1070 .active
1080 RTS
1090 :
1100 .dopoliceman
1110 BNE nopolturn
1120 JSR rand
1130 AND #3
1140 BEQ goaway
1150 LDA image,X
1160 EOR #14
1170 STA image,X
1180 .turn
1190 LDA dx,X
1200 EOR #254
1210 STA dx,X
1220 .nopolturn
1230 RTS
1240 :
1250 .doworm
1260 BEQ goaway
1270 LDA dy,X
1280 BNE drop
1290 LDY ypos,X
1300 LDA xpos,X
1310 CLC
1320 ADC dx,X
```

Continued ▶

◀ **Rites of Spring, listing 4 continued**

```
1330 TAX
1340 JSR hfd
1350 LDX who
1360 CMP ypos,X
1370 BEQ keepgoing
1380 LDA ypos,X
1390 CMP ypos
1400 BCC keepgoing
1410 JSR rand
1420 AND #3
1430 BNE turn
1440 .keepgoing
1450 RTS
1460 .drop
1470 LDA #3
1480 STA exists,X
1490 LDA #1
1500 STA ismoving,X
1510 LDA #0
1520 STA dx,X
1530 RTS
1540 :
1550 .goaway
1560 LDA #254
1570 STA exists,X
1580 RTS
1590 :
1600 .dowfall
1610 LDA dy,X
1620 BNE notlanded
1630 LDA #255
1640 STA ismoving,X
1650 DEC exists,X
1660 .homex
1670 LDY #1
1680 LDA xpos,X
1690 CMP xpos
1700 BCC gonehome
1710 LDY #255
1720 .gonehome
1730 STY dx,X
1740 .notlanded
1750 RTS
1760 :
1770 .showspell
1780 LDA #&C0
1790 BNE mainspell
1800 .wipespell
1810 LDA #0
1820 .mainspell
1830 STA oar
1840 LDA #1
1850 STA it
1860 .loop
1870 LDA it
1880 CLC
1890 ADC misy
1900 TAY
1910 LDX misx
1920 JSR calcaddr
1930 LDA (write),Y
1940 AND #&3F
1950 ORA oar
1960 STA (write),Y
1970 DEC it
1980 BPL loop
1990 RTS
2000 :
2010 .preca
2020 LDY ypos,X
2030 LDA xpos,X
2040 TAX
2050 .calcaddr
2060 LDA lo2%,X
2070 STA write
2080 LDA hi2%,X
2090 STA write+1
2100 TYA
2110 LSR A
2120 LSR A
2130 LSR A
2140 TAX
2150 TYA
2160 AND #7
2170 STA countb
2180 ORA lo%,X
2190 CLC
2200 ADC write
2210 STA write
2220 LDA hi%,X
2230 ADC write+1
2240 STA write+1
2250 LDY #0
2260 RTS
2270 :
2280 .hfd
2290 TYA
2300 CMP #&F0
2310 BEQ bottom
2320 TYA
2330 CLC
2340 ADC #16
2350 TAY
2360 INX
2370 INX
2380 JSR howfardown
2390 SEC
2400 SBC #16
2410 .bottom
2420 RTS
2430 :
2440 .howfardown
2450 STY handy
2460 .howfar2
2470 CPY #128
2480 BCC notsolid
2490 STY presy
2500 LDA div12%-128,Y
2510 CLC
2520 ADC div6%,X
2530 TAY
2540 LDA screen%,Y
2550 LDY presy
2560 AND #31
2570 ASL A
2580 STA it
2590 ASL A
2600 ADC it
2610 ADC mod6%,X
2620 TAY
2630 LDA depths%,Y
2640 STA it
2650 LDY presy
2660 BIT it
2670 BMI notsolid
2680 TYA
2690 AND #240
2700 CLC
2710 ADC it
2720 .checksolid
2730 CMP handy
2740 BCS ntfd
2750 .notsolid
2760 TYA
2770 CLC
2780 ADC #16
2790 TAY
2800 BCC howfar2
2810 LDA #0
2820 .ntfd
2830 RTS
2840 :
2850 .setup
2860 LDA #1
2870 STA bits
2880 LDA #sdat% MOD 256
2890 STA base
2900 LDA #sdat% DIV 256
2910 STA base+1
2920 LDA scrn
2930 STA countb
2940 .gsl
2950 LDY #0
2960 .gsloop
2970 STY counta
2980 LDX #5
2990 LDY #0
3000 STY val
3010 .bgetloop
3020 DEC bits
3030 BNE dontincdb
3040 LDA #8
3050 STA bits
3060 LDA (base),Y
3070 STA gbyte
3080 INC base
3090 BNE dontincdb
3100 INC base+1
3110 .dontincdb
3120 LSR gbyte
3130 ROR val
3140 DEX
3150 BNE bgetloop
3160 LDY counta
3170 LDA val
3180 LSR A
3190 LSR A
3200 LSR A
3210 STA screen%,Y
3220 LDA #0
3230 ASL val
3240 ROL A
3250 ASL val
3260 ROL A
3270 STA val+1
3280 STA addr+1
3290 LDA val
3300 ASL A
3310 STA addr
3320 ROL addr+1
3330 LDA val
3340 CLC
3350 ADC addr
3360 STA val
3370 LDA val+1
3380 ADC addr+1
3390 PHA
3400 LDA val
3410 CLC
3420 ADC #sprb% MOD 256
3430 STA backrlo%,Y
3440 PLA
3450 ADC #sprb% DIV 256
3460 STA backrhi%,Y
3470 INY
3480 CPY #96
3490 BNE gsloop
3500 DEC countb
3510 BPL gsl
3520 LDX #95
3530 .showscreen
3540 JSR mainus
3550 DEX
3560 BPL showscreen
3570 LDY #0
3580 .delcloud
3590 LDA cloudwind,Y
3600 JSR oswrch
3610 INY
3620 CPY #7
3630 BNE delcloud
3640 JSR cloudy
3650 JSR calcbase
3660 .getloop
3670 LDA (addr),Y
3680 STA ypos,X
3690 STA oldypos,X
3700 INY
3710 LDA (addr),Y
3720 STA dy,X
3730 INY
3740 LDA (addr),Y
3750 AND #1
3760 STA flippers,X
3770 LDA (addr),Y
3780 LSR A
3790 STA xpos,X
3800 STA oldxpos,X
3810 INY
3820 LDA (addr),Y
3830 AND #3
3840 SEC
3850 SBC #1
3860 STA ismoving,X
3870 LDA (addr),Y
3880 LSR A
3890 LSR A
3900 AND #3
3910 SEC
3920 SBC #1
3930 STA dx,X
3940 LDA (addr),Y
3950 LSR A
3960 LSR A
3970 LSR A
3980 LSR A
3990 SEC
4000 SBC #2
4010 STA exists,X
4020 INY
4030 DEX
4040 BNE getloop
4050 LDX #4
4060 .setim
4070 LDA #0
4080 STA dying,X
4090 LDY #10
4100 LDA exists,X
4110 BMI notme
4120 CMP #4
4130 BCC notplod
4140 LDY #8
4150 LDA dx,X
4160 BMI notplod
4170 LDY #6
4180 .notplod
4190 STY image,X
4200 .notme
4210 DEX
4220 BNE setim
4230 .arrows
4240 LDX #8
4250 LDA rmask
4260 CMP #&3F
4270 BEQ allvis
4280 LDX #1
4290 .allvis
4300 STX it
4310 LDX #&80
4320 LDA #0
4330 STA tmp
4340 BEQ nox
4350 .arloop
4360 LDX #&00
4370 .nox
4380 LDA scrn
4390 SEC
4400 SBC tmp
4410 JSR isthere
4420 BCC yep
4430 LDX #&88
4440 LDA scrn
4450 CLC
4460 ADC tmp
4470 JSR isthere
4480 BCC yep
4490 INC tmp
4500 LDA tmp
4510 CMP #9
4520 BNE arloop
4530 LDX #&08
4540 .yep
4550 LDA #&00
4560 STA write
4570 LDA #&3F
4580 STA write+1
4590 TXA
4600 PHA
4610 LSR A
4620 LSR A
4630 LSR A
4640 JSR doar
4650 LDA #&60
4660 STA write
4670 LDA #&41
4680 STA write+1
4690 PLA
4700 ASL A
4710 .doar
4720 AND #16
4730 TAX
4740 LDY #0
4750 .makear
4760 LDA ardat,X
4770 STA (write),Y
4780 INX
4790 INY
4800 CPY #24
4810 BNE makear
4820 .rts
4830 RTS
4840 :
4850 .isthere
4860 AND #15
4870 TAY
4880 SEC
4890 LDA rpos%,Y
4900 BMI nope
4910 LDA rtype%,Y
4920 CMP it
4930 .nope
4940 RTS
4950 ]
4960 :
4970 FOR Z%=0 TO &7D:Z%?&900=Z%?&482:NEXT
4980 ?&97E=?2:?&97F=?3
4990 CHAIN "List5"
5000 :
5010 DEF PROCa(zp1,zp2,val%)
5020 [OPT pass%
5030 LDA zp1
5040 CLC
5050 ADC #val% MOD 256
5060 STA zp2
5070 LDA zp1+1
5080 ADC #val% DIV 256
5090 STA zp2+1
5100 ]
5110 ENDPROC
```

◀ **Rites of Spring, listing 5 continued**

```
   10 REM >List5
   20 REM Runemaker - Co
dename: Druid
   30 REM By Chris Rusem
an
   40 REM For BBC B/B+/M
/C
   50 REM (C) BBC Acorn
User
   60 :
   70 LOMEM=L%
   80 FOR Z%=0 TO &7D:Z%
?&482=Z%?&900:NEXT
   90 ?2=?&97E:?3=?&97F
  100 :
  110 PRINTCHR$13;" Lis
ting 5, pass ";pass%;
  120 [OPT pass%
  130 .wipeout
  140 STX ux
  150 STY uy
  160 JSR specupd
  170 LDX ux
  180 LDA uy
  190 PHA
  200 CLC
  210 ADC #15
  220 STA uy
  230 TAY
  240 JSR specupd
  250 LDA ux
  260 CLC
  270 ADC #4
  280 STA ux
  290 TAX
  300 LDY uy
  310 JSR specupd
  320 PLA
  330 TAY
  340 LDX ux
  350 .specupd
  360 CPX #72
  370 BCS rts
  380 TYA
  390 BPL rts
  400 LDA div12%-128,Y
  410 CLC
  420 ADC div6%,X
  430 TAX
  440 .updatesquare
  450 CPX #96
  460 BCS rts
  470 LDA screen%,X
  480 BMI rts
  490 ORA #128
  500 STA screen%,X
  510 .mainus
  520 LDA backrlo%,X
  530 STA read
  540 LDA backrhi%,X
  550 STA read+1
  560 LDA backwlo%,X
  570 STA write
  580 LDA backwhi%,X
  590 STA write+1
  600 LDA #2
  610 STA tmp
  620 LDY #0
  630 .times2
  640 ]
  650 FOR i%=0 TO 47
  660 [OPT pass%
  670 LDA (read),Y
  680 STA (write),Y
  690 INY
  700 ]
  710 NEXT i%
  720 PROCa(write,write,
640-48)
  730 [OPT pass%
  740 DEC tmp
  750 BEQ artyess
  760 JMP times2
  770 :
  780 .create
  790 LDX nasties
  800 .cre2
  810 LDY exists,X
  820 CPY #255
  830 BEQ free
  840 DEX
  850 BPL cre2
  860 .artyess
  870 RTS
  880 .free
  890 STX who
  900 JSR rand
  910 AND #1
  920 CLC
  930 ADC #3
  940 STA exists,X
  950 CMP #4
  960 BEQ makecop
  970 JSR rand
  980 AND #7
  990 SEC
 1000 SBC #4
 1010 CLC
 1020 ADC xpos
 1030 AND #63
 1040 STA xpos,X
 1050 LDA #128
 1060 STA ypos,X
 1070 LDA #10
 1080 STA image,X
 1090 JSR drop
 1100 LDA #24
 1110 JSR sound
 1120 JMP dyis0
 1130 .makecop
 1140 LDA #255
 1150 STA ismoving,X
 1160 LDA #240
 1170 STA ypos,X
 1180 LDA xpos
 1190 AND #63
 1200 EOR #32
 1210 STA xpos,X
 1220 LDY #6
 1230 CMP xpos
 1240 BCC lessthanus
 1250 LDY #8
 1260 .lessthanus
 1270 STY image,X
 1280 JSR homex
 1290 LDA #40
 1300 JSR sound2
 1310 .dyis0
 1320 LDA #0
 1330 STA dy,X
 1340 .updateold
 1350 LDA xpos,X
 1360 STA oldxpos,X
 1370 LDA ypos,X
 1380 STA oldypos,X
 1390 RTS
 1400 :
 1410 .inkey
 1420 LDA #129
 1430 LDY #255
 1440 JSR osbyte
 1450 CPX #255
 1460 RTS
 1470 :
 1480 .showmess
 1490 STA vdu
 1500 LDY #0
 1510 .smloop
 1520 LDA mess,Y
 1530 BMI smend
 1540 JSR oswrch
 1550 INY
 1560 BNE smloop
 1570 .smend
 1580 LDX hiscore
 1590 LDY hiscore+1
 1600 LDA #&A8
 1610 STA write
 1620 LDA #&59
 1630 STA write+1
 1640 BNE dec
 1650 .addsc
 1660 CLC
 1670 ADC score
 1680 STA score
 1690 BCC showscore
 1700 INC score+1
 1710 .showscore
 1720 LDA #&E8
 1730 STA write
 1740 LDA #&37
 1750 STA write+1
 1760 LDX score
 1770 LDY score+1
 1780 .dec
 1790 STX val
 1800 STY val+1
 1810 LDY #0
 1820 .dec1
 1830 LDX #16
 1840 LDA #0
 1850 .dec2
 1860 ASL val
 1870 ROL val+1
 1880 ROL A
 1890 CMP #10
 1900 BCC dec3
 1910 SBC #10
 1920 INC val
 1930 .dec3
 1940 DEX
 1950 BNE dec2
 1960 PHA
 1970 INY
 1980 LDA val
 1990 ORA val+1
 2000 BNE dec1
 2010 .padit
 2020 CPY #5
 2030 BEQ donepad
 2040 LDA #0
 2050 PHA
 2060 INY
 2070 BNE padit
 2080 .donepad
 2090 STY counter
 2100 .showdig
 2110 PLA
 2120 JSR writec
 2130 DEC counter
 2140 BNE showdig
 2150 RTS
 2160 :
 2170 .writec
 2180 ASL A
 2190 ASL A
 2200 STA it
 2210 LDY #0
 2220 .dig1
 2230 LDX it
 2240 LDA digs,X
 2250 STA val
 2260 .dig2
 2270 LDA #0
 2280 ASL val
 2290 ROL A
 2300 ASL val
 2310 ROL A
 2320 TAX
 2330 LDA dtab,X
 2340 AND #&33
 2350 STA (write),Y
 2360 INY
 2370 TYA
 2380 AND #3
 2390 BNE dig2
 2400 INC it
 2410 LDA it
 2420 AND #3
 2430 BNE dig1
 2440 LDA write
 2450 CLC
 2460 ADC #16
 2470 STA write
 2480 BCC dig3
 2490 INC write+1
 2500 .dig3
 2510 RTS
 2520 :
 2530 .gotone
 2540 LDA #12
 2550 STA dying,X
 2560 LDA #0
 2570 STA ismoving,X
 2580 LDA #4
 2590 .sound2
 2600 PHA
 2610 JSR sound
 2620 PLA
 2630 CLC
 2640 ADC #4
 2650 .sound
 2660 STX eggs
 2670 STY why
 2680 TAX
 2690 LDY #&FF
 2700 LDA noises,X
 2710 AND #3
 2720 BEQ setvol
 2730 LDY #0
 2740 .setvol
 2750 STY sblk+3
 2760 LDY #0
 2770 .setblk
 2780 LDA noises,X
 2790 STA sblk,Y
 2800 INX
 2810 INY
 2820 INY
 2830 CPY #8
 2840 BNE setblk
 2850 LDX #sblk MOD 256
 2860 LDY #sblk DIV 256
 2870 LDA #7
 2880 JSR osword
 2890 LDX eggs
 2900 LDY why
 2910 RTS
 2920 :
 2930 .vdu19a
 2940 TAX
 2950 .vdu19
 2960 LDA #155
 2970 JMP osbyte
 2980 :
 2990 .rand
 3000 TXA
 3010 PHA
 3020 TYA
 3030 PHA
 3040 LDY #8
 3050 .r1
 3060 CLC
 3070 LDA rd+3
 3080 BPL r3
 3090 LDX #3
 3100 .r2
 3110 LDA rd,X
 3120 EOR rc,X
 3130 STA rd,X
 3140 DEX
 3150 BPL r2
 3160 SEC
 3170 .r3
 3180 ROL rd
 3190 ROL rd+1
 3200 ROL rd+2
 3210 ROL rd+3
 3220 DEY
 3230 BPL r1
 3240 PLA
 3250 TAY
 3260 PLA
 3270 TAX
 3280 LDA rd+3
 3290 RTS
 3300 :
 3310 .calcbase
 3320 LDA scrn
 3330 ASL A
 3340 ASL A
 3350 ASL A
 3360 ASL A
 3370 ADC #hideout MOD 2
56
 3380 STA addr
 3390 LDA #hideout DIV 2
56
 3400 ADC #0
 3410 STA addr+1
 3420 LDY #0
 3430 LDX #4
 3440 RTS
 3450 :
 3460 .storenasties
 3470 JSR calcbase
 3480 .putloop
 3490 LDA ypos,X
 3500 STA (addr),Y
 3510 INY
 3520 LDA dy,X
 3530 STA (addr),Y
 3540 INY
 3550 LDA xpos,X
 3560 ASL A
 3570 ORA flippers,X
 3580 STA (addr),Y
 3590 INY
 3600 LDA ismoving,X
 3610 CLC
 3620 ADC #1
 3630 STA tmp
 3640 LDA dx,X
 3650 CLC
 3660 ADC #1
 3670 ASL A
 3680 ASL A
 3690 ORA tmp
 3700 STA tmp
 3710 LDA dying,X
```

Continued ▶

◀ Rites of Spring, listing 5 continued

```
 3720 BEQ normal
 3730 LDA #255
 3740 BNE force
 3750 .normal
 3760 LDA exists,X
 3770 .force
 3780 CLC
 3790 ADC #2
 3800 ASL A
 3810 ASL A
 3820 ASL A
 3830 ASL A
 3840 ORA tmp
 3850 STA (addr),Y
 3860 INY
 3870 DEX
 3880 BNE putloop
 3890 RTS
 3900 :
 3910 .typetab
 3920 OPT FNw(dodruid)
 3930 OPT FNw(dodruid)
 3940 OPT FNw(doworm)
 3950 OPT FNw(dowfall)
 3960 OPT FNw(dopolicema
n)
 3970 :
 3980 .cans
 3990 OPT FNw(canspr)
 4000 OPT FNw(canspr+48)
 4010 OPT FNw(canspr+96)
 4020 OPT FNw(canspr+144
)
 4030 OPT FNw(canspr+192
)
 4040 :
 4050 ]
 4060 cyanseq=P%:P%=P%+8
 4070 redseq=P%:P%=P%+8
 4080 flipwhen=P%:P%=P%+
5
 4090 movewhen=P%:P%=P%+
3
 4100 points=P%:P%=P%+5
 4110 heightof=P%:P%=P%+
5
 4120 size=P%:P%=P%+5
 4130 cloudwind=P%:P%=P%
+7
 4140 endata=P%:P%=P%+7
 4150 sblk=P%:P%=P%+8
 4160 noises=P%:P%=P%+52
 4170 warble=noises+14
 4180 epitch=noises+30
 4190 apitch=noises+50
 4200 dtab=P%:P%=P%+4
 4210 rposx=P%:P%=P%+8
 4220 rposy=P%:P%=P%+8
 4230 ardat=P%:P%=P%+40
 4240 lposl=P%:P%=P%+2
 4250 lposh=P%:P%=P%+2
 4260 defcol=P%:P%=P%+3
 4270 ccol=P%:P%=P%+8
 4280 mess=P%:P%=P%+81
 4290 vdu=mess+27
 4300 hiname=mess+28
 4310 rc=P%:P%=P%+4
 4320 div6%=P%:P%=P%+80
 4330 mod6%=P%:P%=P%+80
 4340 losp%=P%:P%=P%+12
 4350 hisp%=P%:P%=P%+12
 4360 lo%=P%:P%=P%+32
 4370 hi%=P%:P%=P%+32
 4380 lo2%=P%:P%=P%+80
 4390 hi2%=P%:P%=P%+80
 4400 backrlo%=P%:P%=P%+
96
 4410 backrhi%=P%:P%=P%+
96
 4420 backwlo%=P%:P%=P%+
96
 4430 backwhi%=P%:P%=P%+
96
 4440 screen%=P%:P%=P%+9
6
 4450 rpos%=P%:P%=P%+16
 4460 rtype%=P%:P%=P%+16
 4470 rounds=P%:P%=P%+8*
8
 4480 ctop=P%:P%=P%+&60
 4490 cbot=P%:P%=P%+&60
 4500 bonus=P%:P%=P%+&10
0
 4510 canspr=P%:P%=P%+&C
0
 4520 digs=P%:P%=P%+&28
 4530 pass%=pass%+2
 4540 :
 4550 FOR Z%=0 TO &7D:Z%
?&900=Z%?&482:NEXT
 4560 ?&97E=?2:?&97F=?3
 4570 :
 4580 IF pass%=2 CHAIN "
List2"
 4590 CHAIN"List6"
 4600 END
 4610 :
 4620 DEF PROCa(zp1,zp2,
val%)
 4630 [OPT pass%
 4640 LDA zp1
 4650 CLC
 4660 ADC #val% MOD 256
 4670 STA zp2
 4680 LDA zp1+1
 4690 ADC #val% DIV 256
 4700 STA zp2+1
 4710 ]
 4720 ENDPROC
 4730 :
 4740 DEF FNw(val%)
 4750 ?P%=val% MOD 256
 4760 P%?1=val% DIV 256
 4770 P%=P%+2
 4780 =pass%
```

```
   10 REM >List6
   20 REM Runemaker - Co
dename Druid
   30 REM Chris Ruseman
   40 REM BBC B/B+/M/C
   50 REM (C) BAU
   60 :
   70 LOMEM=L%
   80 FOR Z%=0 TO &7D:Z%
?&482=Z%?&900:NEXT
   90 ?2=?&97E:?3=?&97F
  100 :
  110 DIM os 40
  120 Q%=P%
  130 Xfrom=&70
  140 Xto=&72
  150 Xnum=&74
  160 Xdone=&76
  170 :
  180 FOR pass%=0 TO 2 S
TEP 2
  190 PRINTCHR$13;"  Lis
ting 6, pass ";pass%;
  200 P%=&4680
  210 [OPT pass%
  220 .game
  230 LDX #rd MOD 256
  240 LDY #rd DIV 256
  250 LDA #3
  260 JSR qsword
  270 LDA #0
  280 STA dying
  290 LDA #3
  300 STA hiscore+1
  310 LDA #13
  320 STA hiscore
  330 LDA #ASC"?"
  340 STA smask
  350 :
  360 LDX #0
  370 .bmloop
  380 LDY #0
  390 STY Xdone
  400 STY Xdone+1
  410 .getbdata
  420 LDA bdata,X
  430 STA Xfrom,Y
  440 INX
  450 INY
  460 CPY #6
  470 BNE getbdata
  480 LDY #0
  490 .movebytes
  500 LDA (Xfrom),Y
  510 STA (Xto),Y
  520 INY
  530 BNE bmove2
  540 INC Xfrom+1
  550 INC Xto+1
  560 .bmove2
  570 INC Xdone
  580 BNE bmove3
  590 INC Xdone+1
  600 .bmove3
  610 LDA Xdone
  620 CMP Xnum
  630 BNE movebytes
  640 LDA Xdone+1
  650 CMP Xnum+1
  660 BNE movebytes
  670 CPX #48
  680 BNE bmloop
  690 LDX #(eoeb-extrabi
t)
  700 .flob
  710 LDA extrabit,X
  720 STA screen%,X
  730 DEX
  740 BPL flob
  750 JMP screen%
  760 :
  770 .extrabit
  780 LDA #143
  790 LDX #12
  800 LDY #255
  810 JSR osbyte
  820 LDA #&40
  830 STA &D00
  840 LDA #31
  850 JSR oswrch
  860 LDA #0
  870 JSR oswrch
  880 LDA #9
  890 JSR oswrch
  900 LDA #32
  910 LDX #2
  920 .cls1
  930 LDY #219
  940 .cls2
  950 JSR oswrch
  960 DEY
  970 BNE cls2
  980 DEX
  990 BNE cls1
 1000 LDX #255
 1010 TXS
 1020 JMP gameloop
 1030 .eoeb
 1040 ]
 1050 spraload=P%:P%=P%+
&3C0
 1060 sprbload=P%:P%=P%+
&BF4
 1070 sdatload=P%:P%=P%+
&3C0
 1080 runeload=P%:P%=P%+
&C0
 1090 div12load=P%:P%=P%
+&80
 1100 scrload=P%:P%=P%+&
2C0
 1110 bdata=P%
 1120 PROCd(spraload,spr
a%,&3C0)
 1130 PROCd(sprbload,spr
b%,&BF4)
 1140 PROCd(sdatload,sda
t%,&3C0)
 1150 PROCd(runeload,rsc
rn%,64)
 1160 PROCd(runeload+64,
runex%,64)
 1170 PROCd(runeload+128
,runey%,64)
 1180 PROCd(div12load,di
v12%,&80)
 1190 PROCd(scrload,&7D4
0,&2C0)
 1200 NEXT
 1210 :
 1220 PRINT''"Loading fi
les..."
 1230 PROCl("CloudT",cto
p)
 1240 PROCl("CloudB",cbo
t)
 1250 PROCl("Runes",bonu
s)
 1260 PROCl("Candle",can
spr)
 1270 PROCl("Digits",dig
s)
 1280 PROCl("MiscDat",cy
anseq)
 1290 PROCl("Sprites",sp
raload)
 1300 PROCl("Scenery",sp
rbload)
 1310 PROCl("ScrDat",sda
tload)
 1320 PROCl("RunePos",ru
neload)
 1330 PROCl("Scrn2",scrl
oad)
 1340 PRINT''"Building t
ables..."'"  1";
 1350 FOR i%=0 TO 31
 1360 addr%=&3000-640+64
0*i%
 1370 hi%?i%=addr% DIV 2
56
 1380 lo%?i%=addr% MOD 2
56
 1390 NEXT:VDU 8,50
 1400 FOR i%=0 TO 79
 1410 lo2%?i%=(8*i%) MOD
 256
 1420 hi2%?i%=(8*i%) DIV
 256
 1430 i%?(div6%)=i%DIV 6
 1440 i%?(mod6%)=i%MOD 6
 1450 NEXT:VDU 8,51
 1460 FOR x%=0 TO 11
 1470 addr%=spra%+80*x%
 1480 x%?(losp%)=addr% M
OD 256
 1490 x%?(hisp%)=addr% D
IV 256
 1500 NEXT:VDU 8,52
 1510 FOR i%=0 TO 95
 1520 x%=i% MOD 12
 1530 y%=i% DIV 12
 1540 addr%=&3000-640+64
0*(16+y%*2)+48*x%
 1550 i%?(backwlo%)=addr
% MOD 256
 1560 i%?(backwhi%)=addr
% DIV 256
 1570 NEXT:VDU 8,53
 1580 FOR y%=0 TO 127
 1590 y%?(div12load)=12*
(y% DIV 16)
 1600 NEXT:VDU 8,54
 1610 FOR round=0 TO 7
 1620 FOR byte=0 TO 7
 1630 READ val
 1640 ?(rounds+round*8+b
yte)=val
 1650 NEXT
 1660 NEXT
 1670 FOR Z%=0 TO &7D:Z%
?&900=Z%?&482:NEXT
 1680 ?&97E=?2:?&97F=?3
 1690 CHAIN"List7"
 1700 :
 1710 DEF PROCd(f%,t%,l%
)
 1720 P%?0=f% MOD 256:P%
?1=f% DIV 256
 1730 P%?2=t% MOD 256:P%
?3=t% DIV 256
 1740 P%?4=l% MOD 256:P%
?5=l% DIV 256
 1750 P%=P%+6
 1760 ENDPROC
 1770 :
 1780 DEF PROCl(f$,a%)
 1790 PRINTCHR$13;SPC20;
CHR$13;"  ";f$;
 1800 i%=OPENUP(f$)
 1810 s%=EXT#i%
 1820 CLOSE#i%
 1830 $os="LOAD "+f$+" "
+STR$~a%:X%=os MOD 256:Y
%=os DIV 256:CALL &FFF7
 1840 ENDPROC
 1850 :
 1860 DATA 1,7,3,80 ,&3F
,160,160,240
 1870 DATA 2,7,3,96 ,&3F
,140,100,200
 1880 DATA 3,3,2,96 ,&3F
,100,80 ,150
 1890 DATA 4,1,2,104,&3F
,100,120,130
 1900 DATA 2,7,1,128,&3C
,90 ,80 ,150
 1910 DATA 4,3,1,128,&3C
,100,100,160
 1920 DATA 4,1,1,144,&3C
,120,255,160
 1930 DATA 4,1,1,160,&3C
,180,160,255
```

◀ Rites of Spring, listing 7

```
10 REM >List7
20 REM Runemaker - Codename: Druid
30 REM By Chris Ruseman
40 REM For BBC B/B+/M/C
50 REM (C) BBC Acorn User
60 :
70 PRINT''"Checking code..."'
80 LOMEM=L%
90 FOR Z%=0 TO &7D:Z%?&482=Z%?&900:NEXT
100 ?2=?&97E:?3=?&97F
110 :
120 FOR list%=2 TO 6
130 PRINTCHR$11;CHR$13;"  Listing ";list%
140 READ num%,from$
150 FOR i%=1 TO num%
160 READ to$,sum%
170 PROCsum(from$,to$,sum%)
180 from$=to$
190 NEXT
200 NEXT
210 PRINT''"  Code O.K. ";&3000-Q%;" Bytes free"''"Loading 'Scrn1' and saving..."
220 $os="SAVE Druid2 "+STR$~gameloop+" "+STR$~P%+" "+STR$~game
230 *KEY0*Load Scrn1 3000|MX%=os MOD 256:Y%=os DIV 256:CALL&FFF7|M
240 *FX138,0,128
250 END
260 :
270 DEF PROCsum(from$,to$,sum%)
280 from%=EVAL(from$):to%=EVAL(to$)
290 tot%=0
300 PRINTCHR$13;SPC36;CHR$13;"    '";from$;"' to '";to$;"' - ";
310 FOR a%=from% TO to%
320 tot%=tot%+?a%
330 NEXT
340 IF sum%=tot% PRINT"OK";:ENDPROC
350 PRINT"checksum error."
360 END
370 :
380 REM Listing 2
390 DATA 8,gameloop
400 DATA setdef,16524
410 DATA nonz,22945
420 DATA notdead,19988
430 DATA rev,20284
440 DATA arune,18858
450 DATA jsrind,19968
460 DATA ouch,21543
470 DATA nhs,17224
480 :
490 REM Listing 3
500 DATA 4,initen
510 DATA recharge,13447
520 DATA showrune,15120
530 DATA indir,22595
540 DATA nodx,21555
550 :
560 REM Listing 4
570 DATA 5,dodruid
580 DATA dopoliceman,18449
590 DATA preca,14454
600 DATA bgetloop,16739
610 DATA setim,19436
620 DATA nope,14946
630 :
640 REM Listing 5
650 DATA 4,wipeout
660 DATA makecop,54676
670 DATA padit,16540
680 DATA rand,17633
690 DATA cyanseq,13027
700 :
710 REM Listing 6
720 DATA 1,game
730 DATA eoeb,20159
```

Rites of Spring, listing 8

```
10 REM >MakeDat (Listing 8)
20 REM Runemaker - Codename: Druid
30 REM By Chris Ruseman
40 REM For BBC B/B+/M/C
50 REM (C) BBC Acorn User
60 :
70 MODE 7
80 DIM w% &1700,os 40
90 dataline%=680
100 data$="/"
110 PRINT"Creating data files..."
120 REPEAT
130 f$=""
140 REPEAT
150 k%=FNb
160 IF k%<>13 f$=f$+CHR$(k%)
170 UNTIL k%=13
180 compacted%=(FNb=1)
190 len%=FNb+256*FNb
200 PRINTCHR$13;SPC30;CHR$13;"  ";f$;", length ";len%;
210 IF compacted% PROCiscomp ELSE PROCnotcomp
220 IF f$="Scrn1" THEN w%?&13B6=20
230 save$="SAVE "+f$+" "+STR$~w%+" +"+STR$~len%+" 0 0"
240 $os=save$
250 X%=os MOD 256:Y%=os DIV 256:CALL &FFF7
260 UNTIL f$="Scrn1"
270 PRINT'"  Data O.K."
280 END
290 :
300 DEF PROCiscomp
310 i%=0
320 REPEAT
330 k%=FNb
340 IF k%<130 OR k%>162 THEN i%?w%=k%:i%=i%+1
350 IF k%=130 THEN i%?w%=FNb:i%=i%+1
360 IF k%>=131 AND k%<=162 PROCcopy(FNb,k%-131+3)
370 UNTIL i%=len%
380 ENDPROC
390 :
400 DEF PROCnotcomp
410 FOR i%=0 TO len%-1
420 i%?w%=FNb
430 NEXT
440 ENDPROC
450 :
460 DEF PROCcopy(off%,n%)
470 FOR j%=i% TO i%+n%-1
480 w%?j%=w%?(j%-off%)
490 NEXT
500 i%=i%+n%
510 ENDPROC
520 :
530 DEF FNb
540 IF LEFT$(data$,1)="/" PROCgetnext
550 v%=EVAL("&"+LEFT$(data$,2))
560 data$=MID$(data$,3)
570 =v%
580 :
590 DEF PROCgetnext
600 dataline%=dataline%+10
610 READ data$
620 chk%=0
630 FOR c%=1 TO INSTR(data$,"/") DIV 2
640 chk%=(chk%+EVAL("&"+MID$(data$,2*c%-1,2))) MOD 256
650 NEXT
660 IF chk%<>EVAL("&"+RIGHT$(data$,2)) PRINT"Error in data line ";dataline%:END
670 ENDPROC
680 :
690 DATA 436C6F7564540D0160003C3C3C/6D
700 DATA 3C8304840728151S3F3F83063F/E6
710 DATA 3F3F83080083072A83103C142A/CA
720 DATA 84123C85118718832286OE3F3F/BE
730 DATA 14832485308709835014 2A8538/CE
```

Continued ▶

YELLOW PAGES

GAMES

◀ **Rites of Spring, listing 8 continued**

```
1000 DATA 0483170F0B0B0B03B318140A0A/94
1010 DATA 020289208929BB12843028O505/E2
1020 DATA 050B03B33014B3300A90303C44/D7
1030 DATA 69676974730D0028007AAD2AA8/4E
1040 DATA 7D5F000A79EF2A0A796D2AA81E/5B
1050 DATA F0AAAAFB6DA0A87BED28A8F17A/97
1060 DATA AA007B6D28A87B6D2AA84D6973/45
1070 DATA 634461740D01110160646760 67/8E
1080 DATA 6067671117171717171717110001/DB
1090 DATA 07000100000700000309051F1F/5E
1100 DATA 18161F0F0F08060F1C000A1109/C8
1110 DATA 0C1A0008080826263300000000/BD
1120 DATA 83040010F1070A1101FF0A10F1/B5
1130 DATA 030A1202000112038295051303/69
1140 DATA C5051204C80513831083200511/0C
1150 DATA 014B831C02831004831C000200/25
1160 DATA 55AAFF001E222A2E2A2226001D/25
1170 DATA 15151D25251D0000051B058355/AB
1180 DATA 051B333333850A830883650A27/EC
1190 DATA 8310270A850A8406C882903536/22
1200 DATA 1160E700C0C3CCCFF0F3FF1C00/74
1210 DATA 1E849511051F03104869676873/72
1220 DATA 636F72653A1F0213110717204C/B2
1230 DATA 656F2042726965666361736520/98
1240 DATA 11041F0418507265737320 1103/91
1250 DATA 537061636583120 31A746F2073/14
1260 DATA 746172742067616D6506FF5382/4F
1270 DATA 85760053707269746573 0D01C0/B3
1280 DATA 03C0C0C08001808015C080153F/6D
1290 DATA 20003F3F83072A402A2A830415/82
1300 DATA 80831C831F4085071515151580/61
1310 DATA 8080C03F3F3F3F830415870 83F/26
1320 DATA 40832D8414852A402A85088451/03
1330 DATA 8357855184582A002A2A80152A/C9
1340 DATA 8649864F836F85518950854584/93
1350 DATA 488751867B402A839F87308640/2A
1360 DATA 836315843C84091083B084A102/B2
1370 DATA 852883C983C483CB899C88A483/62
1380 DATA B483D283D44083CC88D688E084/39
1390 DATA 51008350875185F2835186A580/F2
1400 DATA 15845584ED8F552A83F7845187/43
1410 DATA CD87D31200834883950 0153F83/F3
1420 DATA 0783F184714086F98080808083/B2
1430 DATA F0879D89A485488EF086990083/2E
1440 DATA E883D286502A85E82A210085E8/62
1450 DATA C0877784F183EF8DF1844C84F0/67
1460 DATA 837B83EF887A1083CA10303030/6F
1470 DATA 303F8393202020302B84AF843B/32
1480 DATA 8576842980101000302040852 6/83
1490 DATA 2040C000842E10101011351500/5D
1500 DATA 834B20874C884FC0874F10874F/14
1510 DATA 0084E28750857B834F85C78747/29
1520 DATA 10208456837C15311585E0889D/EE
1530 DATA 86A084E8402A2A2A2A83F383/9D
1540 DATA 763017402A833284B085A02040/95
1550 DATA 852383FD223A2A0084D185A083/AB
1560 DATA CA8526846B83D7008509865184/A7
1570 DATA D88451874F00874F20874F8824/FB
1580 DATA C02A322A2A84DA83F81084DA88/3F
1590 DATA 5783D788F187F88D0E941B8001/74
1600 DATA 0101B083060B0B0B0B0A008406/CB
1610 DATA 0B0083E90A84100184F30A0A0A/AB
1620 DATA A2548A4F050707070 5C0C00083/F1
1630 DATA 07070787088708841040028320/AC
1640 DATA 025363656E6572790D01F40B3C/24
1650 DATA 3C3C3C83048607 8C0D9819A231/E5
1660 DATA 9A53282804840604 0C0D0C3C3C/6C
1670 DATA 000C0804830 8000C0C080C0C04/DF
1680 DATA 830783060C0C832428048308 83/0C
1690 DATA 0B0C080D0E83248319058524 05/30
1700 DATA 088338842D84320E842D833084/20
1710 DATA 14860E080D8440834F830B8419/7E
1720 DATA 040E84268534852883658611 83/24
1730 DATA 07846B834C0A854B850C847085/A9
1740 DATA 1985718368870A859883A184A8/F8
1750 DATA 846F84B804080E83C03C148486/E6
1760 DATA 85FF1414831886FF848E866D86/57
1770 DATA D183D30A0484AE84B883708588/A3
1780 DATA 0E83F8148335862B0E83BA85B2/88
1790 DATA 84C5839F0E0804050C000E83CB/F2
1800 DATA 040D83F20086A3848985F383D4/8B
1810 DATA 080404080483040D83E084B905/55
1820 DATA 85E00585EC84E983F6837288F8/36
1830 DATA 855F835B845F1183DC84070186/27
1840 DATA 1B0011856504220286FF0E838E/E2
1850 DATA 8584080108002202110A080002/63
1860 DATA 221101112313231322028406 04/63
1870 DATA 0011022283048547847984 9884/25
1880 DATA C584AF83FA0085B1847E080D04/C6
1890 DATA 080A83F08529838083798395 83/CD
1900 DATA EB86A484B883F183F80A84D483/25
1910 DATA 7D830A848583DE0E8426839783/C9
1920 DATA 0D000A08080A83140203020301/D3
1930 DATA 8305020002010200018307110 0/2B
1940 DATA 0211002233112211332211330 0/45
1950 DATA 040405040405 83B90100010101/5A
1960 DATA 0103832703843400842D010211/2E
1970 DATA 2200843311832F008434042222/9C
1980 DATA 22220022222828111111282828/83
1990 DATA 03832A33330003855F332383E6/BC
2000 DATA 0022002303008438030300 2214/40
2010 DATA 140202021414148328832E2828/05
2020 DATA 845D0283668 58F849011001300/18
2030 DATA 2211021133858F33832B832E8C/AB
2040 DATA 309EC08930A2C085C01487C03C/85
2050 DATA 83BC04052828140203 0D0183F1/33
2060 DATA 3C3C14140808070 63C3C3C3C84/31
2070 DATA 0C8608860E841488C003050683/9F
2080 DATA C201030884F083F622041908 00/02
2090 DATA 83EE2811081904 83C13C833A14/20
2100 DATA 0A0888402887500886450 40A86/40
2110 DATA 600086181408058768140504 09/34
2120 DATA 0A0404090107060106060 30A03/46
2130 DATA 08000D0984F0040A040C061B00/D1
2140 DATA 11042804041B84C00A26262283/9F
2150 DATA C587960487588648280 40D866E/C0
2160 DATA 0A8618830988C884EC0483F100/6C
2170 DATA 080E8307080E0808080C0C0C0C/FE
2180 DATA 0C040D86090083090A040D0A83/E0
2190 DATA FB833F143C3F2A3F2A2A3F1515/72
2200 DATA 3F2A15830700158 30B2A15003F/29
2210 DATA 2A003F00840A28831F14143C14/39
2220 DATA 2A84F084EC3F152885EC2A142A/63
2230 DATA 2A84FD1583FA84FD0028011020/17
2240 DATA 83242A2A21308408 83F5148508/F1
2250 DATA 28010100030203000301830502/C0
2260 DATA 00020002018307003300111100/E4
2270 DATA 22110014003311332211118 3CE/53
2280 DATA 0022221133020103020101283C/F6
2290 DATA 03020083348329030000018 33B/2A
2300 DATA 1100852F8434842700112233 33/C1
2310 DATA 2222143C845683320384300201/DD
2320 DATA 833B835C84621183280000842E/F1
2330 DATA 833A22842F8332113333028 38C/CF
2340 DATA 838A0100832C0002038509836 2/35
2350 DATA 02836002836313838F849C8393/28
2360 DATA 333300836384B30283B7832A83/EF
2370 DATA 3B0183C385C801832E83AE845C/92
2380 DATA 852C2200835283A9002283C683/C2
2390 DATA C9845B0284CC8430846085 5C22/95
2400 DATA 11028334855C1183FF00830428/ED
2410 DATA 282828830428859502843683C5/45
2420 DATA 0200011383C58464838284CB83/1D
2430 DATA EC86590101836584698 32D8430/06
2440 DATA 839F0083B11383EE221188E683/FE
2450 DATA EE14141414830414842A833428/66
2460 DATA 84B7848D1384D183EB85B58335/14
2470 DATA 33843383EC8830899084BD83F1/DF
2480 DATA 84BB846983EA83C183C483BC00/63
2490 DATA 83FB83E885EA89C084C183F184/DE
2500 DATA F084058 4BC83EC84BD856B9060/49
2510 DATA 84EA8463845D83D002855F2211/A2
2520 DATA 0283BD849B89C03C3C3C8304/21
2530 DATA 8607850D84A2040528040E0808/98
2540 DATA 0B04061408070204058 3A50C02/79
2550 DATA 090102080A8B27853B04080A11/B7
2560 DATA 11112828000A19260533332208/50
2570 DATA 0805849833192600 83FA83CC0D/74
2580 DATA 0183DF04040003090B040C0402/98
2590 DATA 0C000B0983F009000905028317/46
2600 DATA 0A040103080904050208060609/4B
2610 DATA 8319080122192604332233000 5/97
2620 DATA 1122331B3311082605191927 11/62
2630 DATA 3383EE8350222283F227041B22/98
2640 DATA 3319080A830583600C0883E201/43
2650 DATA 0014080E03010604063C140808/9E
2660 DATA 0E04060084D883E48AB087E901/86
2670 DATA 221183A8223308081B26836911/01
```

Continued ▶

◀ Rites of Spring, listing 8 continued

```
2680 DATA 080A001904330A8310832E080A/C2
2690 DATA 149030904084F9282883040103/FC
2700 DATA 02030003020083050102008308/20
2710 DATA 830783EB972E84782211338 3BF/61
2720 DATA 0084C883B82200830783D88637/4B
2730 DATA 00834686488407840183568 3D7/AA
2740 DATA 841083DE8362836F84E8874833/3A
2750 DATA 87481189488360331122836186/64
2760 DATA 2011220086688848863E83AA85/87
2770 DATA 61003C3C83F083F390F084A883/F1
2780 DATA 4883598466845383AD83B9862E/05
2790 DATA 912F3C2800010183A0A2C087C0/F2
2800 DATA 001183A211112885C085B884C0/46
2810 DATA 83B785D8840984E083D989C083/B0
2820 DATA B18351864000011483CB84678A/23
2830 DATA 788C2083E2854811220284C083/52
2840 DATA CB836022834B14008477001128/E6
2850 DATA 11856F83D3836084E284A88598/ED
2860 DATA 9AC0010383C085780200876083/0A
2870 DATA 5884C083A986C00083C8851089/77
2880 DATA C0887885A683AB83FF83C984CA/35
2890 DATA 846F0203843E84ED83F683A683/50
2900 DATA A784A82222222828282883042 8/88
2910 DATA 83ED842E030085FC0002228370/BD
2920 DATA 867485393314141414830414FF/D5
2930 DATA FFFFFFFFFF0E0905835F846883/68
2940 DATA 70020305090E85738911048483/2E
2950 DATA 842B01FF0405050486358638 8B/C8
2960 DATA 0C89170183E8FF00000000840 8/A3
2970 DATA 85369432897101029112851388/41
2980 DATA 928377879A8554005363724461/53
2990 DATA 740D01C00300000000830486 07/59
3000 DATA 8C0D0028831BB4D66AC1048323/BE
3010 DATA 64436049832A200214C4190E83/A1
3020 DATA 0F38C508315C20973C34C63882/48
3030 DATA 83050000E0667031C6160000C0/0B
3040 DATA 0382A082830E8002ECEE0C2648/0E
3050 DATA 00385082842823810 7C2199875/49
3060 DATA C67857CC010000A40622003703/68
3070 DATA 833CE001101F00003C828A31C6/0E
3080 DATA F66610828410E3E62082841 89A/23
3090 DATA B484CE1763829C01B818E30C1E/7C
3100 DATA 780000F08341817731CE0F3C00/6E
3110 DATA 1E782025830F9E3CE066840566/7C
3120 DATA 00DE8428DE0377EF0CD60277EF/1B
3130 DATA FCDE7B818298F1DE7B88F01486/4C
3140 DATA F96002000050600100108305 04/A8
3150 DATA 3A00608282093A829883141082/24
3160 DATA 98000104100060324461828576/61
3170 DATA 0210828E38E2829423CE90EF83/45
3180 DATA 3785FF1000E0E26A0100400200/3A
3190 DATA 408294C0010034C61B63828C31/CE
3200 DATA 072002D001600048001E000904/CD
3210 DATA 21C69CB47031E685FF20814E2B/5C
3220 DATA 8465248288604A7031CEE08104/95
3230 DATA 626420251082841 08A6985FA83/26
3240 DATA 6985FF2284FFC00382A0037031/1B
3250 DATA C61920830F1100204107205E82/0A
3260 DATA 8C71BE18E32CCE482001829083/AE
3270 DATA 948005 84F382A000829885FA11/5C
3280 DATA 0009856B014085FF1AF30400AD/7C
3290 DATA 16001001C53C82882101000880/DC
3300 DATA 180411460CF640108282082182/74
3310 DATA 84876F008541008 3CB86FF0416/2D
3320 DATA 860F17E30C850FE4C53883DE48/B9
3330 DATA 2002D93483C824837802091C88/48
3340 DATA 2D98F768829C01001D2800A805/35
3350 DATA 0A00804007C049100100092010/24
3360 DATA 442167B0F0C41B9F3C85FE2884/55
3370 DATA D5828305400740010010E80020/7F
3380 DATA 0026B85902496D048F78600185/E0
3390 DATA F7406BC55C63CC018332829B6F/34
3400 DATA BEBB5A001000EF012082831000/08
3410 DATA 01703308C71001120842142182/97
3420 DATA 84119EB4836984FF3012000080/18
3430 DATA 828B710682850C006E06310220/5E
3440 DATA 828C10C33D36258BEF0B86FB82/01
3450 DATA 9084327031C63003002200403 6/78
3460 DATA D025004002830AE966830FE031/B6
3470 DATA 82A031B6410C10828430828508/AB
3480 DATA 43828A1952756E65506F730D00/41
3490 DATA C00000000101020202 0F040404/E3
3500 DATA 0F0F0F0E0E0E0D0D0D0D0C0C05/A8
3510 DATA 05060106070808070909090A0A/5F
3520 DATA 0A0B0B0B0C0A0E000001020205/59
3530 DATA 0606070708090A0B0C0F010206/64
3540 DATA 070427303F1F0834040A3A2219/7F
3550 DATA 2D1D233D071C2426122D3C392A/F5
3560 DATA 23072F033C153306222F16220D/7C
3570 DATA 310D401F3F130C37141D18151E/AE
3580 DATA 0C291128 0A0E14092724291312/3C
3590 DATA B8B0B9D1A9A9A9A8B8B8DE8EE2/53
3600 DATA D1D9C9B9C8E8A9A9CEB99E9994/80
3610 DATA A8A8C8A7ADC2B8C7B7C8D8B8B7/73
3620 DATA B8C0C7B0E7DEE7C1F1C1AEE2C8/66
3630 DATA D8C8D1D1E1D1DEACD2C1E1E153/26
3640 DATA 63726E320D01C0023C3C3C3C83/B8
3650 DATA 043C2929292983042905050203/A3
3660 DATA 030313030F0F0F00830B330F3F/55
3670 DATA 2F1F003333032F1F1F2A113323/B5
3680 DATA 033F3F8407133311113333 3333/40
3690 DATA 33330C0C080C0C080C0C040C0D/DB
3700 DATA 040C0E04850E040D8410850A86/6F
3710 DATA 1B0C85100E8410850B83118336/3B
3720 DATA 0E870F080C833000861484 2B0E/C2
3730 DATA 84328435842F833D0A84408320/53
3740 DATA 8361835985318555845184 5A0D/10
3750 DATA 850D834584190887658 44C0E86/4F
3760 DATA 7D83968560058760857084 9587/FC
3770 DATA 180D869783C90E85AD83C9868C/2C
3780 DATA 876883D885E60A861885AF86A3/BA
3790 DATA 83FB0086AF83E30D859885C883/13
3800 DATA 48857E85C884528CA08CC084E8/52
3810 DATA 0585E884BB85DE85DC0D845889/E7
3820 DATA 9784F783C086A684708BE885FB/68
3830 DATA 86A085B883E88D1083EF844F86/36
3840 DATA 20868085DC87FF83F583B785B0/F4
3850 DATA 83D7849D84F4857085CF869285/D9
3860 DATA 1883E88588879787E883F00A86/20
3870 DATA 9A839885808E5083B885B98468/FD
3880 DATA 84E0858083FD0486FF84E8830B/6C
3890 DATA 040C0101010884C90303030303/77
3900 DATA 01080C23130333230303008405/33
3910 DATA 33330313231323333313132233/B6
3920 DATA 831783070413333322 22040E08/FF
3930 DATA 5363726E310D01801600000000/6B
3940 DATA 830486078C0D98198F31103030/8E
3950 DATA 3030830430300F0A0A0A0F0A83/10
3960 DATA 0F1A251A201A30302525250525/9B
3970 DATA 25831F1010101005831783200A/53
3980 DATA 20831F8429832825250F832384/9D
3990 DATA 200505058347250A200F008338/12
4000 DATA 1A00833844787283083 4F8465/35
4010 DATA 854086108568 0F835F0F836025/50
4020 DATA 833F058360834 81A85481A2010/A6
4030 DATA 3083803010865F838E0F849088/14
4040 DATA 5890A884A287C585AF84CB0F83/17
4050 DATA 848519849883C984C80F001083/78
4060 DATA C384C884C586F084C80F0F0F83/CA
4070 DATA C98A8884281A84C88820836F0F/96
4080 DATA 0F844083DB84E8059050 86E883/73
4090 DATA AE862805050F84D08C50874885/F9
4100 DATA 70985889C683A11A84E085BB85/16
4110 DATA F12010838030 1A0583F1861685/08
4120 DATA 200F000F0585F11A2505844083/44
4130 DATA D98528841F862885F085108440/A5
4140 DATA 83D92583F8856100002020 2020/62
4150 DATA 830400000000830486078C0D98/CC
4160 DATA 19A231A2538B7584F8848484B2/9B
4170 DATA 848C84F1850883D2849C1A8322/46
4180 DATA 84A484E19428108728883888 30/80
4190 DATA 885084F08C6090680587689048/FC
4200 DATA 309F589028886888708878 88D0/1F
4210 DATA 0F889887D00F87F088188888A0/5C
4220 DATA 282587F0884888E8885088D088/BC
4230 DATA D89028903088988 8F083DF8DD0/A7
4240 DATA 84D984F883E795209018902888/E0
4250 DATA 5091482020855F8564890A9213/6E
4260 DATA A22583FE153F2A85AC2A3F1585/FA
4270 DATA B40C04865C0C0C870887088F10/7B
4280 DATA 9F2084498FA4A2509D78088858/AE
4290 DATA 08A2FCA2FF050584FF0F0A85FB/6D
4300 DATA 0FA2528E280A853E8346A24095/C6
4310 DATA 400F8740834A8682A2D3A1F53F/35
4320 DATA 3F2A85FF2A3F1585FF0C0486FF/84
4330 DATA 0C0C870887088F109F20000015/A9
4340 DATA 15865089E4A2509D7808879000/7E
4350 DATA 0886AB84B083B4151583C0836C/00
4360 DATA 846F3F3F86D1002A83D3830483/52
4370 DATA 1B2A2A83D88527832886278633/87
```

Continued ▶

YELLOW PAGES

JOE'S JOTTINGS

See Joe's Jottings, page 72

◀ Rites of Spring, listing 8 continued

```
4380 DATA 86F486FB83433F3F8628834386/39
4390 DATA 4684FD11332222222233110084/5B
4400 DATA 0722228F108F109F2084408858/EC
4410 DATA 88609011A02185FF0505889F0A/09
4420 DATA A2429642A240A240000AA27FA0/4B
4430 DATA F12A3F3F2A2A2A2A15840715/20
4440 DATA 15150083048407 3F3F84FF8306/C6
4450 DATA 851E2A86072A3F861E832D8709/A7
4460 DATA 1586288449862985488328 3F85/7B
4470 DATA 2B891E00113322222222331100/E2
4480 DATA 840722228F108F109F20844000/90
4490 DATA 0C85FB10000C850930870887 08/84
4500 DATA 8F109F208E4085D03087D68A10/AB
4510 DATA A26897880886A085078B588860/AE
4520 DATA 04886885099A888F380F88A086/28
4530 DATA 09992889C887280A87D805A240/1A
4540 DATA 9540897898708 8B889C885F930/1D
4550 DATA 008507A2308A388F109F209240/50
4560 DATA A268A27899C820303030303030/C5
4570 DATA 1093D190E19F20A240A260A280/AA
4580 DATA A2A8A2C8A2E8A2F8A2F8A2F8A2/AE
4590 DATA F8A2F8A2F8A2F8A2F8A2F8A2F8/94
4600 DATA 90F83030303030 2087FE87FD8D/2E
4610 DATA 0E9A1BA235A257A279A29BA2BD/4A
4620 DATA A2DFA2FF9CFF152A86FF2A15A2/62
4630 DATA FFA2FFA2FFA2FFA288A2AAA2CC/C6
4640 DATA A2EEA2FF8AFF152A3D3C83FF3F/33
4650 DATA 2010003F8307102010830A152A/05
4660 DATA 86088316870886188820002A15/3B
4670 DATA 83281583FF2A1500203E85FF87/EA
4680 DATA 48221185481122118 30A152A86/DE
4690 DATA 088316870886188820834883 28/EC
4700 DATA 8748228D48A290A290A2909A90/86
4710 DATA 37113785D81585D885812A8487/89
4720 DATA 04080483FB0408051F05082010/FB
4730 DATA 08040A2F0A04847E0804088C88/7D
4740 DATA 83DA3E84C8153B223B3D844683/1E
4750 DATA FF2A858F83F987FF8708831085/E6
4760 DATA 778318882083F900221183B884/28
4770 DATA DA1485481083D1888883F884FF/2D
4780 DATA 2087FF87088310857F83188820/0F
4790 DATA 844820108D48118748A2909890/0B
4800 DATA 85D884E2A2909390 83C086D835/EE
4810 DATA 3E3C3C3C3C83048607840D3F87/99
4820 DATA 122A3D861B20871187088920 92/9C
4830 DATA 3A9E48228759870 8A248A290A2/6F
4840 DATA 90A290A29087F087C73C1087D1/5D
4850 DATA 0420860A0810201584C48506A2/76
4860 DATA 4089F81187D987083C873F89F0/3C
4870 DATA 98CF90481087D98708A248A290/5A
4880 DATA A290A290A29086FF3C/57
```

Rites of Spring, listing 9

```
10 REM >Druid (Listing 9)
20 REM Runemaker - Codename: Druid
30 REM By Chris Ruseman
40 REM For BBC B/B+/M/C
50 REM (C) BBC Acorn User
60 :
70 MODE 2:VDU 23;8202;0;0;0;
80 COLOUR 134
90 FOR C%=0 TO 15
100 READ V%
110 VDU 19,C%,V%;0;
120 NEXT
130 ENVELOPE 1,1,-3,-1,-1,255,255,255,
0,0,0,0,0,0
140 ENVELOPE 2,1,-1,2,1,1,2,1,60,0,0,-
60,60,0
150 ENVELOPE 3,1,0,0,0,1,1,1,100,-2,-1
,-3,100,50
160 ENVELOPE 4,2,-1,-1,-1,10,10,10,12,
-1,-1,-12,127,100
170 *Run Druid2
180 :
190 DATA 0,1,2,3,4,5,0,7
200 DATA 7,7,7,7,7,7,7,7
```

```
10 REM >Teleprompt
20 REM by Joe Telford
30 REM for BBC B/B+/M/C/A
40 REM (c) BAU April 1989
50 :
60 MODE 7
70 ON ERROR PROCerr
80 PROCsetup
90 PROCtitle(r$,w$,"Tele-Prompt")
100 time=FNtime*100
110 REPEAT
120 title$=FNtitle
130 ch%=OPENUP title$
140 UNTIL ch%<>0
150 OSCLI("KEY 0 *EXEC !VIDEO!M"+title
$+"|M")
160 CLS
170 PRINT r$;CHR$157
180 PRINT r$;CHR$157
190 TIME=0:REPEAT UNTIL TIME>=time
200 PRINT y$;CHR$157
210 PRINT y$;CHR$157
220 TIME=0:REPEAT UNTIL TIME>=time
230 PRINT g$;CHR$157
240 PRINT g$;CHR$157
250 TIME=0:REPEAT UNTIL TIME>=time
260 REPEAT
270 chars=0
280 line$=""
290 TIME=0
300 REPEAT
310 chars=chars+1
320 A%=BGET# ch%
330 IF A%>31 AND A%<126 THEN line$=lin
e$+CHR$A%
340 IF A%=9 THEN line$=line$+STRING$(8
-(LENline$ MOD 8)," ")
350 UNTIL A%=13 OR LENline$>=38 OR EOF
# ch%
360 REPEAT UNTIL TIME>time
370 PRINT CHR$141;line$:PRINT CHR$141;
line$
380 UNTIL EOF# ch%
390 CLOSE# ch%
400 PRINT g$;CHR$157
410 PRINT g$"File Closed..Press ESCAPE
 to quit"
420 PRINT g$"or RETURN to re-run"
430 PRINT g$;CHR$157
440 REPEAT A=GET
450 UNTIL A=13
460 RUN
470 :
480 DEF PROCdblht(x$,x,y)
490 PRINT TAB(x-1,y);CHR$(141);x$
500 PRINT TAB(x-1,y+1);CHR$(141);x$
510 ENDPROC
520 :
530 DEF PROCspace(x$)
540 PRINT TAB(3,24);x$;"Press the SPAC
E BAR to continue";:*FX15,1
550 REPEAT UNTIL GET$=" "
560 ENDPROC
570 :
580 DEF PROCbacking(x$)
590 LOCAL j%
600 CLS
610 FOR j%= 0 TO 24
620 PRINT TAB(0,j%);x$;CHR$157;
630 NEXT
640 ENDPROC
650 :
```

Continued▶

JOE'S JOTTINGS

◀ Joe's Jottings, listing 1 continued

```
  660 DEF PROCtitle(backn$,forgn$,title$
)
  670 PROCbacking(backn$)
  680 title$=forgn$+title$
  690 PROCdblht(title$,(20-LEN(title$)DI
V2),6)
  700 title$=forgn$+"Another one of"
  710 PRINT TAB((20-LEN(title$) DIV 2),1
3);title$
  720 title$=forgn$+"Joe's Jottings"
  730 PRINT TAB((20-LEN(title$) DIV 2),1
6);title$
  740 PROCspace(forgn$)
  750 ENDPROC
  760 :
  770 DEF PROCsetup
  780 r$=CHR$129
  790 g$=CHR$130
  800 y$=CHR$131
  810 b$=CHR$132
  820 m$=CHR$133
  830 c$=CHR$134
  840 w$=CHR$135
  850 f$=CHR$136
  860 PROCvalid
  870 *KEY0 *EXEC !VIDEO|M
  880 ENDPROC
  890 :
  900 DEF FNgpi(len,effect,valid$)
  910 LOCAL a$,b
  920 a$=""
  930 PRINT STRING$(len,".");STRING$(len
+1,CHR$(8));" ";
  940 *FX15,1
  950 b=GET:IF b=13 THEN =a$
  960 IF b=127 AND a$="" THEN GOTO 950
  970 IF b=127 THEN a$=LEFT$(a$,LEN(a$)-
1):PRINT CHR$b;".";CHR$(8);:GOTO 950
  980 IF effect=0 THEN GOTO 1010
  990 IF effect=1 THEN b=b AND 223 ELSE
b=b OR 32
 1000 IF effect=3 AND (RIGHT$(a$,1)=" "
OR a$="") THEN b=b AND 223
 1010 IF LEN(a$)=len OR INSTR(valid$,CHR
$b)=0 VDU7:GOTO 950
 1020 PRINT CHR$b;:a$=a$+CHR$b
 1030 GOTO 950
 1040 :
 1050 DEF PROCvalid
 1060 cap$=" ABCDEFGHIJKLMNOPQRSTUVWXYZ"
 1070 low$=" abcdefghijklmnopqrstuvwxyz"
 1080 nos$=".0123456789"
 1090 pun$=" !#$%&'()=?/*:+;.,<>"+CHR$34
 1100 all$=cap$+low$+nos$+pun$
 1110 file$=cap$+low$+nos$+"!$&*"
 1120 ENDPROC
 1130 :
 1140 DEF FNtime
 1150 PROCbacking(b$)
 1160 REPEAT
 1170 PRINT TAB(3,5);w$"How long between
 lines?"
 1180 PRINT TAB(3,6)w$"(in seconds)";TAB
(29,5);
 1190 time=VAL(FNgpi(3,0,nos$))
 1200 UNTIL time>0 AND time<10
 1210 =time
 1220 :
 1230 DEF FNtitle
 1240 REPEAT
 1250 PRINT TAB(3,10);w$"Which file shou
ld I use?";TAB(29,10);
 1260 title$=FNgpi(10,0,file$)
 1270 UNTIL title$>"$"
 1280 =title$
 1290 :
 1300 DEF PROCerr
 1310 CLOSE #0
 1320 IF ERR=17 THEN OSCLI("FX 138,0,128
"):END
 1330 CLS:REPORT:PRINT "at line ";ERL:EN
D
```

◀ Joe's Jottings, listing 2

```
   10 REM View Multi-columns
   20 REM by Joe Telford
   30 REM for BBC B/B+/M/C/A
   40 REM (c) BAU April 1989
   50 :
   60 MODE 7
   70 lppdef=56
   80 gapdef=10
   90 erf=0
  100 ON ERROR PROCerr
  110 PROCsetup
  120 PROCtitle(r$,w$,"VIEW-COLUMNS")
  130 PROCgetdetails
  140 ch%=OPENUP title$
  150 OSCLI("KEY 0 CLOSE#0|M*EXEC !VIEW|
M"+title$+"|M")
  160 MODE 3
  170 PROCconvert1
  180 MODE 7
  190 PROCgetmoredetails
  200 MODE 3
  210 PROCconvert2
  220 IF print$="S" THEN OSCLI("KEY 0 CL
OSE#0|M*EXEC !VIEW|MC."+title$+"|M")
  230 PRINT "Done"
  240 END
  250 :
  260 DEF PROCconvert2
  270 PRINT "Converting to ";cpp;" colum
ns per page"
  280 IF print$="P" THEN PRINT "Please s
etup your printer then press SPACE": REP
EAT UNTIL GET=32:VDU2
  290 ch%=OPENUP "Wtemp"
  300 left=EXT#ch%
  310 IF print$="S" THEN PRINT "Directin
g to spool file: C.";title$:OSCLI("SPOOL
 C."+title$)
  320 break$=STRING$(((cpp*(cpl+cga)-cga
)-10)/2,"-")+"Page-Break"+STRING$(((cpp*
(cpl+cga)-cga)-10)/2,"-")
  330 margin$=STRING$(cga DIV 2," ")+cl$
  340 margin$=margin$+STRING$(cga-LENmar
gin$," ")
  350 REPEAT IF (left/(cpl+2))/cpp > lpp
 THEN end=lpp ELSE end=INT(((left/(cpl+2
))/cpp)+.99)
  360 start=EXT#ch%-left
  370 FOR line=1 TO end
  380 FOR col=1 TO cpp
  390 PRINT FNgetline((line-1)*(cpl+2)+(
end*(col-1)*(cpl+2))+start);margin$;
  400 NEXT
  410 PRINT
  420 NEXT
  430 IF print$="S" THEN PRINT break$
  440 IF print$="P" AND feed$<>"M" THEN
FOR loop=1 TO gap:PRINT:NEXT
  450 IF print$="P" AND feed$="M" THEN V
DU 3:PRINTbreak$:PRINT"Add next sheet."'
"set to top of form"'"Press Space when p
rinter is ready":REPEAT UNTIL GET=32:VDU
 2
  460 left=left-(end*cpp*(cpl+2))
  470 UNTIL left<=0
  480 CLOSE# ch%
  490 *SPOOL
  500 VDU3
  510 ENDPROC
  520 :
  530 DEF FNgetline(ptr)
  540 IF ptr>=EXT# ch%-cpl-1 THEN =STRIN
G$(cpl," ")
  550 A$=""
  560 PTR# ch%=ptr
  570 LOCAL loop
  580 FOR loop=1 TO cpl
  590 A$=A$+CHR$(BGET#ch%)
  600 NEXT
  610 =A$
  620 :
```

Continued ▶

◀ **Joe's Jottings, listing 2 continued**

```
  630 DEF PROCconvert1
  640 PRINT "Converting to ";cpl;" chara
cter wide column"
  650 chars=0:lines=0
  660 *SPOOL wtemp
  670 REPEAT
  680 eol=0:spcs=0:line$=""
  690 REPEAT
  700 IF chars=0 THEN REPEAT:A%=BGET# ch
%:UNTIL A%<>32 AND A%<>9:ELSE A%=BGET# c
h%:IF A%=9 THEN A%=32
  710 IF A%>126 THEN PROCditchto(13):UNT
IL FALSE
  720 IF A%=13 AND chars>0 THEN A%=32:eo
l=eol+1:ELSE IF A%<>13 eol=0
  730 IF A%>31 AND A%<127 THEN line$=lin
e$+CHR$A% :chars=chars+1
  740 IF A%=32 THEN spcs=spcs+1
  750 UNTIL chars>=cpl OR EOF#ch% OR eol
>1
  760 PROCreadback
  770 PROCprocess(line$,cpl,cga,just$,sp
cs)
  780 chars=0:lines=lines+1
  790 eol=0:spcs=0
  800 UNTIL EOF# ch%
  810 CLOSE# ch%
  820 *SPOOL
  830 erf=1
  840 PRINT "Temporary file created"
  850 PRINT "Wtemp= Ascii code padded wi
th spaces"
  860 PRINT "Press SPACE to go on or ESC
APE to exit"
  870 REPEAT UNTIL GET=32
  880 erf=0
  890 ENDPROC
  900 :
  910 DEF PROCprocess(line$,cpl,cga,just
$,spcs)
  920 IF just$="N" OR spcs=0 THEN line$=
line$+STRING$(cpl-LENline$," "):PRINT li
ne$:ENDPROC
  930 share=(cpl-LENline$) DIV spcs
  940 spare=(cpl-LENline$) MOD spcs
  950 PROCfnd(spcs)
  960 IF share>0 THEN FOR loop=1 TO spcs
:temp$=MID$(line$,pos%(loop),LENline$):l
ine$=LEFT$(line$,pos%(loop)-1)+STRING$(s
hare," ")+temp$:pos%(loop+1)=pos%(loop+1
)+share*loop:NEXT
  970 IF spare>0 THEN FOR loop=1 TO spar
e:PROCfit(RND(spcs)):NEXT
  980 PRINT line$
  990 ENDPROC
 1000 :
 1010 DEF PROCfit(x)
 1020 LOCAL loop
 1030 temp$=MID$(line$,pos%(x),LENline$)
 1040 line$=LEFT$(line$,pos%(x)-1)+" "+t
emp$
 1050 FOR loop=x TO spcs
 1060 pos%(loop+1)=pos%(loop+1)+1
 1070 NEXT
 1080 ENDPROC
 1090 :
 1100 DEF PROCfnd(n)
 1110 LOCAL loop,text$
 1120 text$=line$
 1130 pos%(0)=0
 1140 FOR loop= 1 TO n
 1150 temp=INSTR(text$," ")
 1160 pos%(loop)=pos%(loop-1)+temp
 1170 text$=MID$(text$,temp+1,LENtext$)
 1180 NEXT
 1190 ENDPROC
 1200 :
 1210 DEF PROCditchto(chr)
 1220 REPEAT UNTIL BGET# ch% = chr
 1230 ENDPROC
 1240 :
 1250 DEF PROCreadback
 1260 IF INSTR(line$," ")=0 THEN ENDPROC
 1270 len=LENline$
 1280 REPEAT
 1290 IF MID$(line$,len,1)<>" " THEN len
=len-1:PTR#ch%=PTR#ch%-1
 1300 UNTIL MID$(line$,len,1)=" " OR PTR
#ch%=0
 1310 REPEAT
 1320 IF MID$(line$,len,1)=" "THEN len=l
en-1:PTR#ch%=PTR#ch%-1:spcs=spcs-1
 1330 UNTIL MID$(line$,len,1)<>" " OR PT
R#ch%=0
 1340 line$=LEFT$(line$,len)
 1350 ENDPROC
 1360 :
 1370 DEF PROCdblht(x$,x,y)
 1380 PRINT TAB(x-1,y);CHR$(141);x$
 1390 PRINT TAB(x-1,y+1);CHR$(141);x$
 1400 ENDPROC
 1410 :
 1420 DEF PROCspace(x$)
 1430 PRINT TAB(3,24);x$;"Press the SPAC
E BAR to continue";
 1440 *FX15,1
 1450 REPEAT UNTIL GET=32
 1460 ENDPROC
 1470 :
 1480 DEF PROCbacking(x$)
 1490 LOCAL j%
 1500 CLS
 1510 FOR j%= 0 TO 24
 1520 PRINT TAB(0,j%);x$;CHR$157;
 1530 NEXT
 1540 ENDPROC
 1550 :
 1560 DEF PROCtitle(backn$,forgn$,title$
)
 1570 PROCbacking(backn$)
 1580 title$=forgn$+title$
 1590 PROCdblht(title$,(20-LEN(title$)DI
V2),6)
 1600 title$=forgn$+"Another one of"
 1610 PRINTTAB((20-LEN(title$) DIV 2),12
);title$
 1620 title$=forgn$+"Joe's Jottings"
 1630 PRINTTAB((20-LEN(title$) DIV 2),13
);title$
 1640 title$=forgn$+"From the BBC Acorn
User Magazine"
 1650 PRINTTAB((20-LEN(title$) DIV 2),16
);title$
 1660 PROCspace(forgn$)
 1670 ENDPROC
 1680 :
 1690 DEF PROCsetup
 1700 r$=CHR$129:g$=CHR$130
 1710 y$=CHR$131:b$=CHR$132
 1720 m$=CHR$133:c$=CHR$134
 1730 w$=CHR$135:f$=CHR$136
 1740 hl$=CHR$&1D:un$=CHR$&1D
 1750 PROCvalid
 1760 DIMpos%(30)
 1770 *KEY0 *EXEC !VIEW!M
 1780 ENDPROC
 1790 :
 1800 DEF FNgpi(len,effect,valid$)
 1810 LOCAL a$,b
 1820 a$=""
 1830 PRINT STRING$(len,".");STRING$(len
+1,CHR$(8));" ";
 1840 *FX15,1
 1850 b=GET
 1860 IF b=13 THEN =a$
 1870 IF b=127 AND a$="" THEN GOTO 1850
 1880 IF b=127 THEN a$=LEFT$(a$,LEN(a$)-
1):PRINTCHR$b;".";CHR$(8);:GOTO 1850
 1890 IF effect=0 THEN 1920
 1900 IF effect=1 THEN b=b AND 223 ELSE
b=b OR 32
```

Continued▶

◀ Joe's Jottings, listing 2 continued

```
 1910 IF effect=3 AND (RIGHT$(a$,1)=" "
OR a$="") THEN b=b AND 223
 1920 IF LEN(a$)=len OR INSTR(valid$,CHR
$b)=0 THEN VDU7:GOTO 1850
 1930 PRINT CHR$b;
 1940 a$=a$+CHR$b
 1950 GOTO 1850
 1960 :
 1970 DEFPROCvalid
 1980 cap$=" ABCDEFGHIJKLMNOPQRSTUVWXYZ"
 1990 low$=" abcdefghijklmnopqrstuvwxyz"
 2000 nos$=".0123456789"
 2010 pun$=" !#$%&'()=?/*:+;.,<>"+CHR$34
 2020 all$=cap$+low$+nos$+pun$
 2030 file$=cap$+low$+nos$+"!$&*"
 2040 ENDPROC
 2050 :
 2060 DEF PROCgetmoredetails
 2070 PROCbacking(m$)
 2080 PROCdblht(y$+"More Information:",1
0,1)
 2090 print$=FNprint
 2100 cl$=FNcl
 2110 def$=FNdef:lpp=lppdef:gap=gapdef:f
eed$="A"
 2120 IF def$="N" lpp=FNlpp
 2130 IF print$="P" AND def$="N" THEN ga
p=FNgap
 2140 IF print$="P" feed$=FNfeed
 2150 ENDPROC
 2160 :
 2170 DEF FNdef
 2180 REPEAT
 2190 PRINT TAB(3,9);w$"Use default A4 p
age details?";TAB(37,9);
 2200 def$=FNgpi(1,0,"YN")
 2210 UNTIL def$>""
 2220 =def$
 2230 :
 2240 DEF FNlpp
 2250 PRINT TAB(3,11);w$;"text makes ";l
ines;" lines in 1 column"
 2260 REPEAT
 2270 PRINT TAB(3,12);w$"Lines of text p
er page?";TAB(37,12);
 2280 lpp=VAL(FNgpi(3,0,nos$))
 2290 UNTIL lpp>10
 2300 =lpp
 2310 :
 2320 DEF FNgap
 2330 REPEAT
 2340 PRINT TAB(3,14);w$"Lines gap betwe
en pages?"TAB(37,14);
 2350 gap=VAL(FNgpi(2,0,nos$))
 2360 UNTIL gap>1 AND gap<=72-lpp
 2370 =gap
 2380 :
 2390 DEF FNfeed
 2400 REPEAT
 2410 PRINT TAB(3,16);w$"Manual/Auto pap
er feed? (M/A)";TAB(37,16);
 2420 feed$=FNgpi(1,0,"MA")
 2430 UNTIL feed$>""
 2440 =feed$
 2450 :
 2460 DEF FNprint
 2470 REPEAT
 2480 PRINT TAB(3,5);w$"Use Printer/Spoo
lfile? (P/S)";TAB(37,5);
 2490 print$=FNgpi(1,0,"PS")
 2500 UNTIL print$>""
 2510 =print$
 2520 :
 2530 DEF FNcl
 2540 REPEAT
 2550 PRINT TAB(3,7);w$"Margin character
 (eg | or spc)";TAB(37,7);
 2560 cl$=FNgpi(1,0,"!*| ><.:;,{}[]%`&()
'#1/\")
 2570 UNTIL cl$>""
 2580 =cl$
 2590 :
 2600 DEF PROCgetdetails
 2610 PROCbacking(b$)
 2620 PROCdblht(y$+"Information:",13,1)
 2630 title$=FNtitle
 2640 cpl=FNcpl
 2650 cga=FNcga
 2660 cpp=FNcpp
 2670 just$=FNjust
 2680 ENDPROC
 2690 :
 2700 DEF FNtitle
 2710 REPEAT
 2720 PRINT TAB(3,5);w$"Which file shoul
d I use?";TAB(30,5);
 2730 title$=FNgpi(10,0,file$)
 2740 UNTIL title$>"$"
 2750 =title$
 2760 :
 2770 DEF FNcpl
 2780 REPEAT
 2790 PRINT TAB(3,7);w$"How many charact
ers per line?";TAB(37,7);
 2800 cpl=VAL(FNgpi(3,0,nos$))
 2810 UNTIL cpl>9 AND cpl<132
 2820 =cpl
 2830 :
 2840 DEF FNcga
 2850 REPEAT
 2860 PRINT TAB(3,9);w$"How many chrs be
tween cols?";TAB(37,9);
 2870 cga=VAL(FNgpi(2,0,nos$))
 2880 UNTIL cga>0 AND cpl+cga<=128
 2890 =cga
 2900 :
 2910 DEF FNcpp
 2920 REPEAT
 2930 PRINT TAB(3,11);w$"How many column
s across the page?";TAB(37,11);
 2940 cpp=VAL(FNgpi(2,0,nos$))
 2950 UNTIL cpp>0 AND cpp*(cpl+cga)<=132
 2960 PRINT TAB(3,12);w$"allowing "cpl+c
ga" chr spaces per line"
 2970 =cpp
 2980 :
 2990 DEF FNjust
 3000 REPEAT
 3010 PRINT TAB(3,14);w$"Justify columns
? (Y/N)";TAB(37,14);
 3020 just$=FNgpi(1,0,"YN")
 3030 UNTIL just$>"":=just$
 3040 :
 3050 DEFPROCerr
 3060 CLOSE# 0
 3070 IF ERR = 17 AND erf=1 THEN OSCLI("
FX 138,0,128"):END
 3080 IF ERR = 17 AND erf=0 THEN RUN
 3090 CLS:REPORT:PRINT "at line ";ERL:EN
```

►

See Music, page 135

```
"part1X" [%Using QTIME to LOAD and RUN
%one program from another
REP( QTIME -100 #< )UNTIL( IDLE )REP
"KEY7|""nextprog"" LOAD RUN |!M" OSCLI
"FX153,0,135" OSCLI
]
```

```
"RUN"[% The inclusion of part1X in a
%PLAY command in order to load a new
%piece of music after the piece has
%finished playing. This assumes part1a
%plays the last note in the piece
"12345678-aX" PLAY
]
```

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THIS MONTH'S LISTINGS

This month's disc sees the launch of *BBC Acorn User*'s latest game, *Codename: Druid*. Battle with the elements, the riot squad and creepy crawlies in your aim to collect runes from Stonehenge.

The first of two programs from Joe's Jottings allows you to print wordprocessing files in large print on screen in teleprompt fashion. The second program lets you format wordprocessing files into a number of columns.



From Agora this month there is a colour selector for 256-colour mode; a file comparer and a one-line graphics bonus. Plus there's a demonstration to help you use the Arc's floating point emulator.

With lots of Hints & Tips, the April disc is great value at only £5.95 for the 5.25-inch and £6.95 for the 3.5-inch.

Don't forget that it is cheaper to subscribe to our monthly discs. See page 113 for details.

Become a Druid and take on the riot squad

GAMES DISC

Ten of the best *Acorn User* games on one 80-track double-sided 5.25-inch disc.

Whether you're into arcade or adventure type games this new disc has something for everyone. The games included are *Warlord, Wizalon, Castle of Nightmares, Run Silent, Run Deep, Polyominoes* and *Quadline*. We have also included three of the most popular one-line games from recent Abusers. Test your knowledge with *Mastermind* and start playing *Varpon* and *Lurch* to win.

Make sure you get your disc of fun and entertainment and send off for the Games disc today. At only £8.95 it will make the perfect gift.

Games galore for just £8.95



'87 COMPILATION DISC

Acorn User has put all your favourite programs, routines and utilities from 1987 on one disc.

Featured are: Kiddie Art; Tapestry; PCB by CAD; Autumn and Theme, our music programs from April '87. Also featuring on the disc is Joe Telford's GEM-like front end for the Master including a desktop calendar and year planner.

Other useful utilities include a proportional screen dump, a *View* printer driver generator, a monitor-testing routine and a routine for printing spreadsheets sideways.



The second half of the disc is devoted to graphics, with a video image enhancer and six of the best Graphics Bonuses.

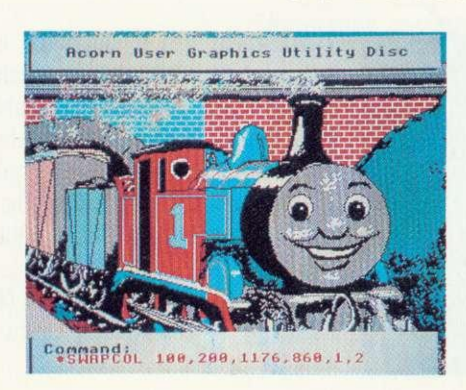
The *Acorn User* '87 Compilation disc comes in 5.25-inch 80-track format, with a comprehensive manual which includes all function key strips and instructions needed for the programs.

All the very best of '87 on one disc

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SOFTWARE & GRAPHICS



Great graphics utilities

The 40-track 5.25-inch *Graphics Utilities* disc which is keenly priced at £7.95, features not only 16 stand-alone machine code utilities, an advanced teletext editor and several useful Basic procedures, it also has an easy-to-adapt disc header and index.

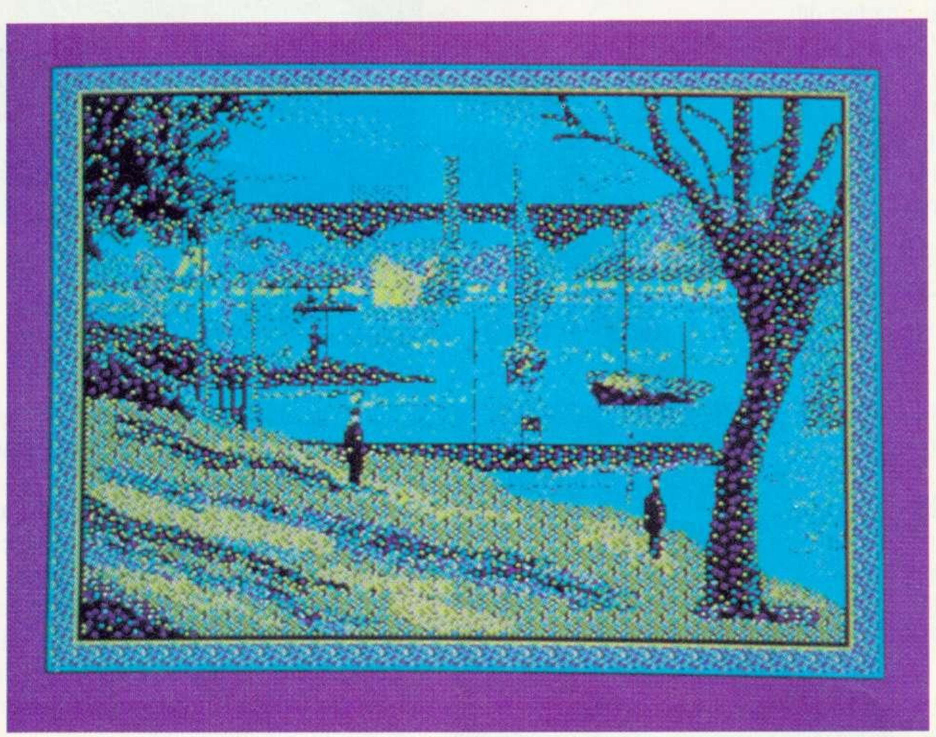
Included are: *ROTATE, rotates area through 180 degrees; *SWAPCOL, swaps two colours; *COLFILL, a colour-fill routine; *SVPIC, saves a compacted picture; *LDPIC, reloads a compacted picture. There are also many utilities to manipulate graphics.



Sideways RAM made simple

The *Acorn User* sideways RAM disc gives you many more utilities for your sideways RAM. These include: RAMpad – your computer's answer to the pad and pen; six different on-screen fonts available in all modes; a 15k printer buffer; Screen Swap – store and recall mode 4 or 5 screens; *ROMHEAD – standard service ROM header; *RLOOK – allows you to examine sideways RAM or ROM.

There are many more utilities on this 40/80-track 5.25-inch disc and it's a snip at £9.95.



Micro masterpieces on Portfolio for £9.95

Jonathan Inglis, freelance illustrator, has assembled a *Portfolio* of his best work exclusively for *BBC Acorn User*.

The disc contains screens that have been used by national and regional publications. Included are Seurat's *Bathers*, a *Time Out* cover from August 1985, and two familiar *Acorn User* covers, Willow (Nov '86) and Magician (Jan '86), as well as several pictures commissioned by *The Times*.

Three of Jonathan's favourite masterpieces are on the disc; Seurat's *Riverside*, Vermeer's *Lady at the Virginal* and a copy of a famous lithograph by Matisse. Sade fans will probably be more interested in the two stunning portraits of the singer included on the disc.

You can create your own pièce de résistance using the *Pixel Editor* and *Super Painter* programs. *Pixel Editor* allows you to draw in and alter minute detail, while *Super Painter* enables you to draw lines, texture your screen and shade by mixing the eight standard colours.

Portfolio comes in 80-track 5.25-inch format with a comprehensive instruction sheet telling you about the pictures and how the artist created them. This disc can be yours for only £9.95.

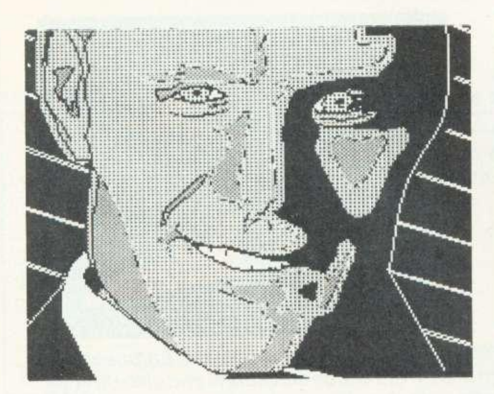
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OFFERS

USERDUMP ROM

BBC/B/ B-/M/ C The *UserDump* ROM will allow you to dump any screen image in any display mode by entering a single command – either as a line of your program or by typing it directly from the keyboard. A perfect dump can also be obtained while a machine code program is running.

UserDump can dump a graphics window, make a distortion-free dump of mode 0 screens using plotter graphics, translate a teletext screen into mode 1, and shift any area of memory.

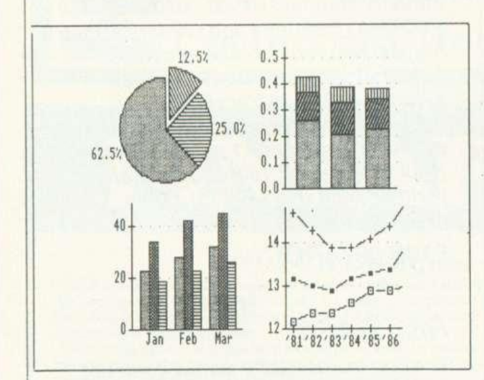


UserDump will work with any Epson-compatible printer which has single-density and double-density bit-image graphics including the Star Gemini, Delta, SG, SD and SR, Canon and Kaga NLQ.

Details of further commands and printer compatibility are available from Seran at Redwood Publishing Ltd, 20-26 Brunswick Place, London N1 6DJ.

Trouble-free screen dumps for £19.95 with UserDump

VIEWCHART DISC



BBC/B/ B-/M/ C *ViewChart* features a suite of programs which can be used to produce high-resolution graphics in pie chart, bar chart or line graph form. Data can be entered manually, or read from *ViewSheet*, *ViewStore* or *View* files.

Present figures with ViewChart

The charts can be labelled and shaded to give a really professional appearance.

Epson-compatible screen dumps are included, one of which will produce a print-out to the full width of an A4 sheet. Screen dumps for other printers can be painlessly installed.

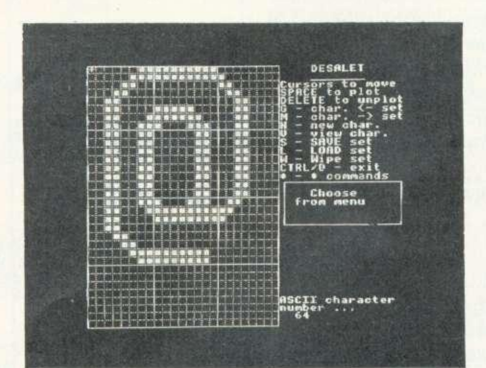
The software is provided on a 5.25-inch 40-track disc (with 80-track converter). And the price of this professional package? Just £12.95.

CALLIGRAPHY DISC

BBC/B/ B-/M/ C/E Now you can produce anything from professional tickets to letterheads and posters with the *Calligraphy* disc.

Desalet is a font creator which produces customised letters to your personal design and saves you using repetitive data statements and error-prone calculations. All font sets can be up to 94 characters long.

Modical allows the use of disc-based font sets created with *Desalet*. *Modical* incorporates a modified file creation program, which allows files to be printed out immediately or saved for later.



An enhanced font ROM, in the form of a sideways RAM image, allows you to design your own fonts for use on-screen. Any output to the printer will be in the new font – thus giving true Wysiwyg.

This superb disc comes on 40/80-track 5.25-inch disc and is only £9.95.

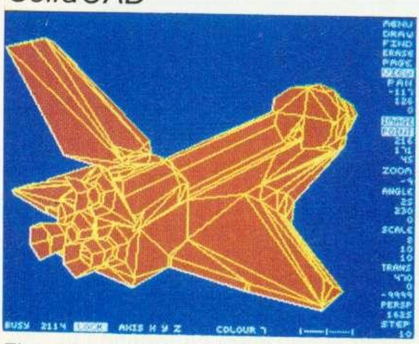
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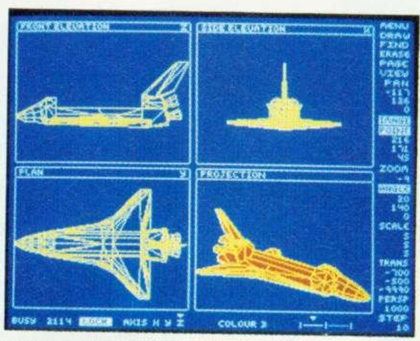
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REALTIME SOLIDS MODELLER

The package includes both the sophisticated design environment of SolidCAD and the high speed animation capability of a Realtime Graphics Language (RGL) module developed in pure ARM Risc code for supercharged performance. The package is ideal for Architectural design, Interior design, Engineering design & teaching CDT. The RGL module can be used to create standalone flicker-free animation of designs from your own programs. Smooth shading is also performed for realistic images. Through our in-house expertise in 3D Design and High-speed techniques, no other package can rival the design environment & animation speed of the Realtime Solids Modeller.

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SUPER-DUMP

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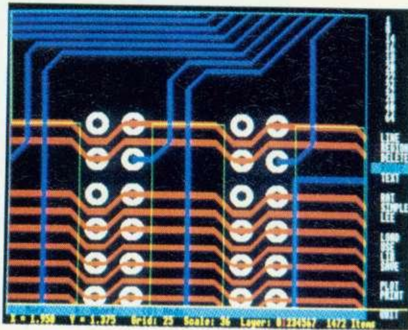
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REVIEWS

THE GAMES PAGE

PLEBS IN FLIGHT

Sam Greenhill takes us into the spring with the latest on the games front

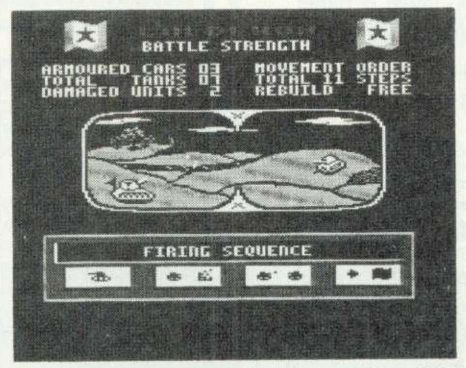
As the sun approaches the spring equinox, the biggest news this month is the release of *BBC Acorn User*'s own game, *Runemaker – Codename: Druid*. An advance copy certainly impressed me.

On a more serious note, the Games Page has joined forces with New Zealand artist Lance To, to make available a game map of Bubblebus' *StarQuake*. The finely detailed map fills two sheets of A3 and comes complete with hints and teleport codes. All this for a mere £1. For a copy, send a stamped addressed envelope to the address at the end of the page along with a cheque or postal order made out to Redwood Publishing Ltd.

Now down to the real business. The hidden game in Gem Electronics' *Word up Word Down* for the Arc is up to the company's usual standard of utter nonsense! Entitled *Pleb Up Pleb Down*, it can be accessed by clicking on the 'o' of the word 'now' at the bottom of the screen with the Adjust mouse button, having first selected the smiley face from the Options menu. The idea is to save the plebs who launch themselves in great quantities from a high rise building by accurately positioning a mattress to break their fall. It's great fun, and some might even enjoy it more than the game itself!

Superior, which is still promising *One Night in Bangkok* has released details of a Trivial Pursuits-type game which has been designed specifically for the micro as opposed to a board-game conversion. It currently lacks a name but should be worth looking into in the summer.

Superior is also looking at the Spectrum market, its first release being *Repton-Mania* – a package comprising the first two versions of *Repton*. And apart from *Barbarian 2* out any time now, the only other games that we'll be seeing in the near future are more of the *Play it Again Sam* series. *Sam 8* contains *Repton*'s first journey around the world, *Mr Wiz*, *Quest*, and also Tynesoft's *Winter Olympiad*. Its predecessor, number 7, which seems brilliant value, should already be out. It has *Bonecruncher*, *Ghouls*, *Snapper* and a version of *Firetrack* for BBC and Electron users.



Tank Attack: computer/board game from CDS

Clares is following up the three recently released Arc 'games' with another, called *Overload*. Professor Frankenstein has created a number of small monsters which run amok through sixty mazes. In the 'persona' of a bouncing metal ball, it is your task to squash the Frankies and claim victory. However, for some reason they must be flattened in the correct order. It is important to do this, for if you fail the monster will split, ameoba-like, into two. By the time this article hits the streets, the game should be about one week into its life.

A company in Somerset called Great Elm Services has released its latest catalogue of software for BBC and Electron users. The programs aren't games as such, but could well provide a useful source of both amusement and education. In essence, the software covers crosswords and other word puzzles, which can either be created or solved, or both. For a copy of the software list, contact John at Great Elm, Frome, Somerset BA11 3NZ.

Impact has announced the creation of Joe's brother, Archie. As you can guess, his disc contains a bundle of cheats for Archimedes games. *Cheat it Again, Archie* contains pokes for most of the popular Arc games including – among others – the obvious *Zarch*, *Pacmania*, *Alerion*, some of Minerva's games and the company's own *Quazer*.

Tynesoft, which has finally released *Superman* and *Circus Games* after the longest two weeks in recorded history, now has a three-dimensional pinball game on offer, plus two others. The pinball game is different because the player gets to sit just behind the rolling ball as it bounces off bells and rubber wedges. Should be interesting if anything, and providing the programmers do it well, definitely worth purchasing.

The second game is something of a mystery. Indeed I know nothing about it apart from the title, *I was Kidnapped by a Flying Saucer*. I assure you, your guess is as good as mine.

From the processor of Orlando, the programmer behind *Firetrack*, comes this month's second three-dimensional ball game. This time it's in the form of pool, and is being sold by Rainbird (*Corruption*, *Fish*! *Sentinel*, *Cholo*). Available for the BBC, Elk and Archimedes, the game employs a unique idea for aiming the cue. It doesn't. Instead, the control keys activate the table and this can rotate on two axes. This facility provides a range of possibilities, because the cue tip can be aimed at any precise point on the ball.

Finally, please send any cheats or high scores you might happen to have lying around to us at The Games Page, *BBC Acorn User*, Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ.

GAMES

FINS AHOY



Fish!; Rainbird, Archimedes 3.5-inch disc, £24.95

Fish! is Magnetic Scrolls' fifth adventure, the second to be converted for the Archimedes and I was pleased to find that it is every bit as facetious as it's early games – *The Pawn, Guild of Thieves* and *Jinxter* – and unlike the more serious-minded *Corruption*.

You play an inter-dimensional espionage agent and must single-handedly foil the latest fiendish ploy of 'The Seven Deadly Fins'. The Fins have sabotaged 'The Machine' that prevents all the water evaporating from the Fish world.

The game starts belly-up in a goldfish bowl – what did you expect, oil lamps, bunches of keys and twisty passages?

The first section of the adventure involves swimming through the three warps the 'backroom boys' have constructed for you, and collecting the components for the focus wheel – a vital part of the sabotaged Machine.

This is fairly easy, and provides a very nice introduction. The second part is much harder, and involves exploring Hydropolis in the guise of Professor Roach, an emminent fish scientist. The other parts of the Machine are dotted about the city in various states of repair, and you have until 4pm to reassemble the missing stream regulator.

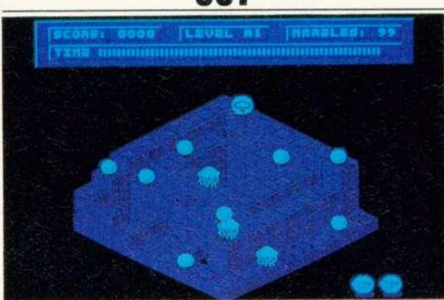
The game understands many words, and will accept long and complicated sentences. The location descriptions are very detailed and have lots of suitably awful puns on fish and the sea. In addition, about a third of the locations are beautifully illustrated; watch out for the particularly accurate rendition of Battersea power station!

Overall, I found the game great fun to play, the puzzles involving a fair amount of lateral thinking, but none totally insurmountable – so much so, that after four days of near-constant playing, I finished the game with a score of 491, 10 points off maximum.

To sum up? A very light hearted adventure that's well worth the cash.

David Lawrence

ALIAS 007



Orbital; Impact Software, tape (Electron or BBC) £4.95, disc (BBC B or Master) £5.95

Orbital is the third game on Impact Software's product list. Once again a weird story accompanies the game, centring around the main character 'Ozzie'. Ozzie is a marble, the James Bond of the Orbital world, and has been sent to destroy the evil Octopodes. These are small octopuss-type creatures who are polluting the Orbital planet with Plutonium marbles. Making sense so far?

The first twelve screens greatly resemble the general layout of Blue Ribbon's *Crystal Castles*. Ozzie must collect all the marbles, walking down and using 'Star Trek' - like transporters to go back up again. After the first twelve levels have been completed, they are done again – in the dark.

The game employs about the right level of difficulty, which means that by the time you get to these levels they shouldn't be too difficult to complete.

The game is strange to say the least, and the default keys difficult to use. Fortunately they are redefinable, but the three-dimensional view of the landscape makes selection quite a chore.

There are many things I don't like about *Orbital* – the fact that you can often die without appearing to touch a patrolling Octopode, and the way that you must complete the first level just to get onto the second. There is a password system concerning blocks of four levels, but I would have liked to have a code for individual screens.

Overall *Orbital* is not a particularly colourful game, but I liked it much better than *Clogger* and *Zenon*. I was occupied by it for more time than both of these put together.

Sam Greenhill

CHOP PHOOEY

The Last Ninja; Superior Software, BBC B, B+, Master, Compact, Electron cassette £9.95, 5.25-inch disc £11.95, 3.5-inch disc £14.95

The Last Ninja is nothing more nor less than a standard implementation of a standard combat game. It's got a fictitious history longer than your average list of Bruce Lee films. All the Ninjutsu Ninjas are wiped out on the island of Lin Fen by Kunitoki, the evil Shogun of the Ashikaga Clan. Foolishly, his warriers allow one to escape – and this last Ninja returns to the island for revenge.

You can walk, jump or twiddle your limbs in a most professional manner. But my Ninja didn't seem to be quite as agile as the Ninjas in the films. Various objects are scattered around the island and if you visit a shrine, important data on what is still needed is available from a wise chap who sits cross-legged on the top step.

Weapons can also be found, and among the five you may come across, the smoke bomb and throwing stars are the most useful. One thing I didn't like was the difficulty of getting out of a fight once I began losing.

The graphics are a bit blocky, the keys are a bit difficult to use, and the standard mode 2 font on the supervisor screen gives an old feel to the game. But for me, it's the action that counts, and this certainly isn't bad. It isn't the best game this month but if you enjoyed *Karate Combat*, and *The Way of the Exploding Fist* then you could be attracted by it.

Sam Greenhill

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WHAT ADVANTAGES DOES ARCHIMEDES QUEST HAVE OVER OTHER VERSIONS?

Very large datafiles - well over 3Mb of data in RAM on an A440, yet Archimedes Quest works equally well on an A305.
Very fast - 7 seconds to count every reference to Hamlet spoken in the first act of the play.
Graphics and statistics built in - bar charts, pie charts, scattergraphs, histograms, percentages and more in full colour. Created quickly and easily on a whole file or selected subsets.
Improved command language - search files using queries like *sex is "male"* or *name starts "Eli"* as well as all the commands from previous versions.
Numerous other improvements as suggested by existing Quest users - for example extra fields can be added, fields can be deleted, serial fields can be created and much more.

CAN I USE DATA FROM OTHER PACKAGES?

Archimedes Quest is fully compatible with existing Quest datafiles. It can import and export data in both CSV and TSV formats allowing interchange with packages such as *Pipedream* and *1st Word Plus.* It also supports the File Interchange Format allowing data to be transferred to and from other machines such as the RM Nimbus.

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FLIGHT OF FONTASY

Dave Futcher investigates font generator packages that really do improve your print-out and looks at two processors with their own built-in fonts

Most people with a standard dot-matrix printer have a strong desire to get more out of it than the normal dotty listing or wordprocessed text. Although almost every printer now comes with a near letter quality (NLQ) mode, which certainly makes better looking reports and documents possible, computer users still want better results. Not all of us can afford printer perfection – laser printers, or the inkjet and liquid-crystal printers reviewed in January's *BBC Acorn User*.

To help you get better quality for less money, there's a range of products that can turn out the sort of print you didn't think possible from a dot-matrix printer.

Readers who have one of the older dot-matrix printers that don't have a NLQ mode should not despair either. There are two ROMs you can buy that give a simple but effective NLQ mode.

The Watford *NLQ ROM* has been around for a number of years and it will make any tired old Epson MX-80 print just like the latest NLQ printer. The NLQ facility is called into action by a star command or by sending the Ascii codes 129 and 193. Watford has imitated the Canon PW1080-style print-out rather well, with the NLQ print being achieved with two passes of the printer's head.

Hyperdriver from Dabs Press is a full-blown printer control chip, much more comprehensive than the *NLQ ROM*. In addition to simplifying control of your printer via star commands and highlights, it also has an outstanding NLQ function. The output is not as fine as a printer's built-in NLQ printing, but many people seem to prefer the bolder result. With *Hyperdriver*, speed is sacrificed for quality as three passes of the print head are necessary for each line of text – this gives the equivalent of a 24-pin printer.

Another way to produce higher quality print-out, is to redefine the character set that the printer uses. Printers such as the Star NL-10 and LC-10, Taxan KP-810 and KP-910, and Canon PW1080 and PW1156 have RAM chips fitted, or an empty socket to fit them into, and this allows the printer to take character definitions downloaded from your micro. It's like using VDU 23 to redefine the characters the micro uses on screen. CJE Micros and Watford Electronics have both produced packages that use this technique – *Fontaid* and *NLQ Designer* respectively. Both packages are extremely easy to use and because the character designs are stored on disc, you can have several different fonts and only download the one you want. New fonts are downloaded to the printer from disc with star commands. Changing fonts within a document is straightforward so different lines or paragraphs can be printed in different styles. In addition, both utilities allow you to use the Ascii characters 0 to 32 to define a logo or a banner – perhaps to use as a letterhead. *Fontaid* is supplied with a disc packed full of fonts, including Gothic, Bold, Shadow, Outline, Broadway, Engraved, Italic, Square, Computer and a special font made up of mathematical symbols. Three additional font discs are also available, giving a total range of 30 different fonts.

This is Hyperdriver'
combination of Pala
Wallace Nicoll. Print
double density grap

Hyperdriver: sacrifices speed for quality

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abcdefghijkl
1234567890

Fontwise Plus: crisp, dark high quality fonts

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Fontaid: comes with 30 different fonts

NLQ Designer comes supplied with just three fonts, but the quality is high. There is a very good Courier font – the sort used on typewriters – plus Bold and Gothic. And nearly 30 other fonts are available as extras. Both packages allow excellent results to be achieved. *Fontaid* is probably easier to get to grips with, although *NLQ Designer* has a very clearly written manual.

Another category of font software could best be described as a complete printer language. Clares *Fontwise Plus* and Beebugsoft's *Printwise* are the best examples of this type.

Text is first prepared using a wordprocessor, and all the major BBC wordprocessing packages are supported – *Wordwise Plus, InterWord, View* and *Mini Office*. *Printwise* also has its own built-in text editor for entering short text of up to 400 words.

When something needs to be printed the program is run and the prepared text loaded in. The multi-font program then prints it out. However both packages are also intelligent in that they can also interpret codes embedded into the text that set up line spacing, line length, indents, centring, justification, paging and so on.

Both packages manage to produce print which many people do not believe was printed on a nine-pin dot-matrix printer. There is really little to choose between them. I personally think that *Fontwise Plus* has the best range of fonts. They are crisp, dark and of the highest quality. Probably the real difference between the packages is the range of sizes of text which they can produce. *Fontwise Plus* can manage just three –

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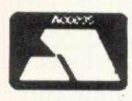
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normal, condensed, and enlarged – while *Printwise* is considerably more versatile in this area. Some 20 different sizes are possible, but this is achieved by using a range of four separate fonts – smaller or larger versions of the same thing – each covering a different range of sizes.

In 1986, Permanent Memory Systems released an outstanding piece of font software called *Multi-Font NTQ* which runs with *Wordwise*, *InterWord*, *View* and *WordPower*. The package was supplied on two sideways ROM chips, and has seven built-in fonts. Each could be printed in 16 combinations of height, width and background, which meant an amazing variety. PMS has now developed a range of additional fonts to use with the package, and approximately 60 different fonts are available for about £2 each. The ability to store new fonts in sideways RAM is a great bonus, and makes this package stand out.

PMS uses a similar system with *The Publisher*, a 64k PAL-PROM based program. It extends the original multi-font concept by adding a page description language and a Wysiwyg preview option. *The Publisher* chip contains the driver software and 16 fonts – further fonts can be had by adding extra chips or loading in RAM images in the same way as *Multi-Font NTQ*.

Print-out from *The Publisher* is remarkable. It can be in any of four pitches – 10cpi, 12cpi, 15cpi or proportional spacing. Like *Multi-Font NTQ*, the width and the height of the characters can be up to 16 times normal size, and there's a number of extra DTP-like facilities, including the ability to produce lines, boxes around text and underlining in various styles. To control all these, you embed special Escape codes within normal wordprocessed text.

With care *The Publisher* can produce impressive looking documents. It isn't desktop publishing, because there's no facility for multi-column work. But the quality of the print-out is first class and the way it interfaces with your normal wordprocessor and lets you preview the text on screen makes it unique.

So far we have looked at font packages that are used with, or in conjunction with, your normal word-processor. There is of course another option – change your wordprocessor for a font-based one. Anyone wanting to obtain the best printed output from their micro printer should also consider two educational wordprocessing packages called *Folio* and *Pendown*.

We are very pleas
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Multi-Font NTQ: seven built-in fonts

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Studio. There will be t
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The Publisher: has DTP-like facilities

The first version of Tedimen's *Folio* came with seven font styles that could be printed in three different sizes. As well as specialised school pages which included two and three-column layouts, *Folio* can print in 80-character width and a variety of text shapes (waves, wedges, diamonds, circles). Educational authorities across the country bought licences to this remarkable package for 1.2p per child in

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Folio: specialised school pages

the 5-12 age range. Home users had to pay £15. Now a considerably enhanced version is available with over 20 new fonts for £25.

Pendown is what Logotron calls a child centred wordprocessing environment. It even has a dictionary and outline planner. In addition, it has the facility to print in a wide variety of fonts, in three sizes. Small fonts can be printed out in the standard *Pendown* page width of 40; medium text is printed with a maximum page width of 10 for printing. A decent range of fonts is available with names like Chunky, Jumbo, Gothic, Moderna, Script, Times, Felt, Shadow and some rather exotic ones like Holiday, Smile, and Fleur.

If you require just near letter quality print from an ordinary printer, Dabs *Hyperdriver* offers a higher quality image than the Watford *NLQ ROM*. However if you really want to explore different fonts these are both rather limited packages. It's fair to say *Hyperdriver*'s NLQ ability is only a sideline.

If you have a printer that allows you to download new character definitions or add extra RAM chips, both *Fontaid* and *NLQ Designer* have a lot to offer. High quality print-out is easily obtained while using your normal wordprocessor. However they cannot really compete with *Fontwise* or *Printwise* when the actual output is examined.

I rate these two highly. They're both good value for money. But they do introduce an extra step to printing – you have to prepare the text first then load it into the package.

The two multi-font packages from PMS, *NTQ* in particular, seem to offer the best alternative if you keep it simple and continue using one of the popular ROM-based wordprocessors. *The Publisher* needs extra work putting in codes if you want to make use of the boxes and lines.

NLQ ROM *costs £20 and* NLQ Designer *costs £25 from Watford Electronics, 250 Lower High Street, Watford, WD1 2AN.* Hyperdriver *costs £29.95 from Dabs Press, 76 Gardner Road, Preswich, Manchester M25 7HU.* Fontwise Plus *costs £20 from Clares Micro Supplies, 98 Middlewich Road, Northwich, Cheshire CW9 7DA.* Printwise *costs £30 from Beebugsoft, Dolphin Place, Holywell Hill, St Albans, Herts AL11 1EX.* Fontaid *costs £30 from CJE Micros, 78 Brighton Road, Worthing, West Sussex BN11 2EN.* Multi-Font NTQ *costs £34 and* The Publisher *costs £46 from Permanent Memory Systems, 38 Mount Cameron Drive, St Leonards, East Kilbride G74 2ES.* Enhanced Folio *costs £25 from Tedimen Software, PO Box 23, Southampton.* Pendown *costs £34 from Logotron Ltd, Dales Brewery, Gwydir Street, Cambridge.*

GIFT OF THE GAB

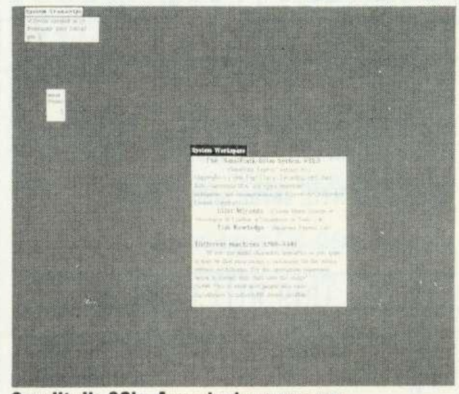
Smalltalk is a little-known programming environment which, along with the Arc, has great potential for education. Alex van Someren takes a look at how it's developing

Smalltalk-80 is a programming environment. Most people know little about it, but its influence permeates the computer industry very deeply. *Smalltalk-80* was developed by researchers at the famous Xerox Palo Alto Research Centre. Xerox PARC has been a centre of innovation, particularly in trying to make computers easier for people to work with. *Smalltalk* was devised as a testbed for this kind of work and embodies many features which are now vital – for example the windows, icons, menus and pointer system of the Arc borrows directly from *Smalltalk*.

Historically, the system has only been available on expensive, high-powered scientific workstations (including Xerox's own 'Dorado' machine). *Smalltalk* requires a very fast computer and vast memory to be useful – the designers realised that hardware advances would eventually make this power available at only moderate cost. Only now is it becoming possible to run it on affordable desktop computers – and Smalltalk Express has just released it on the Archimedes 440.

Smalltalk is unusual in that it is both a programming language and an 'operating system'. Things like the keyboard, screen and disc system are all presented by *Smalltalk* in its own, consistent way. On other micros, *Smalltalk* looks and behaves exactly the same – one of the few real examples of compatibility.

Furthermore, *Smalltalk* is 'object oriented'. This is an approach which attempts to encourage a structured approach to programming, and make the use of complex data structures easier. Instead of procedures and functions acting on specific kinds of data (procedural programming), object-oriented programs treat everything as 'objects' which are manipulated by giving them 'messages'. Chunks of data can thus be thought of as black boxes which respond to messages but whose internal appropriate make-up is irrelevant. Each box of



Smalltalk-80's Arc start-up screen

data has instructions on how to respond to various messages within it – so sending an 'add' message to a box always gets the appropriate answer, no matter what sort of data the box contains. The 'add' message can be used to add two integers, two arrays of integers or two complex numbers – its exact effect depends solely on the type of object to which it is sent. The great beauty of this approach is, of course, its consistency. It enforces good programming by making it difficult to take advantage of specific details of data structures.

To make development of programming projects easier, objects which have similar properties are grouped together in 'classes'. A particular object within a class is known as an 'instance' of that class; so the number 654 is an instance of the integer class. And objects can 'inherit' properties or behaviour from other, superior, classes. So an integer is an instance of the class of numbers, whose other descendents are floating-point numbers and fractions.

The class and inheritance schemes reduce the amount of programming you have to do, by allowing new objects to draw on the previously defined features of existing ones. All numbers respond to operations such as addition, and only the specific details of how it's performed needs to be altered to deal with a new kind of number (say, complex numbers). In *Smalltalk-80* every single aspect of the system is an object, from integers right through to the language compiler itself. Here the consistency of the object approach begins to bear fruit.

The entire programming environment behaves in exactly the same way – drawing a line on the screen involves the same message-sending technique as compiling a program.

The Smalltalk-80 user interface

One of the features for which *Smalltalk-80* is noted is its user interface – the way the system looks to the user. Xerox PARC developed the Wimp approach to make computers easier to use – instead of having to remember long sequences of commands at the keyboard, a simple 'point-and-press' approach using a mouse with buttons allows you to 'guess' how to operate the system.

The attraction of the Wimp approach is not just that it looks pretty or that it is simple to learn. It's useful because it allows you to see several things at once – a typical *Smalltalk-80* screen might show the program under development in one window, the output from the program in another, parts of the system source code in a third and programmer's notes in a fourth. There is no question of having to switch from one file to another, clearing the screen in the process – this is a real time-saver.

Smalltalk makes very extensive use of windows – to enter program text you use a mouse button to call up a menu and choose to create a new 'workspace'. A window appears and program text may be typed in using the built-in text editing features. To try out the program, you simply highlight the area to be executed by dragging the mouse over it and then choose 'Do it' from a menu.

The system compiles the code and the output (if any) appears. In fact, the Wimp approach is taken further in *Smalltalk-80* than in any other computing

system. The whole system revolves around windows in which information may be entered and displayed.

Smalltalk-80 is constructed out of some 23,000 objects, each of which may be called up and examined using a specialised window known as a 'browser'.

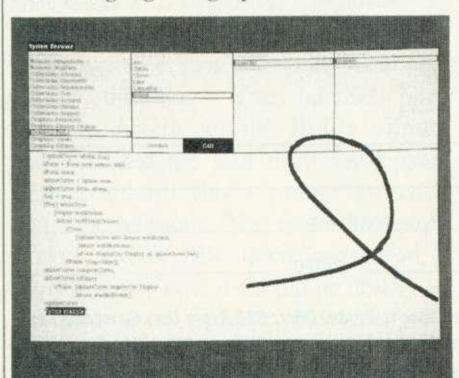
If you want to find out how a particular object works you can use a browser to pick through the system and display the program that controls the object in question.

You can copy the code directly into your own program, and modify it there to suit your own use. So instead of having to write every piece of a project from scratch, a library of routines from the system itself may be used. In fact, you can easily modify the system code itself. If you don't like the way in which the window system works, or the font being used, or a compiler error message, you can browse through the source code, alter it and then re-compile to give a new, customised system in seconds.

Smalltalk-80 on the Archimedes 440

The first thing you realise with *Smalltalk-80* is that it is big! Several megabytes of files are stored in a compressed form on the discs, and the de-compression process ensures that the system is only usable with a hard disc. Nearly two megabytes of RAM are required just to hold the system software, leaving around two megabytes free for your projects if the machine is configured for minimum RMA, font, screen and buffer RAM. But if you want more modules, then you can restrict the amount of memory *Smalltalk-80* uses.

The Archimedes runs *Smalltalk* admirably – it runs at nearly the full speed of the Xerox Dorado, a machine which was designed to execute languages like *Smalltalk* efficiently. *Smalltalk* itself is not known for being fast when compared to the C language or graphics environments like the Arc Desktop, but it gives acceptable response. On slower machines dragging *Smalltalk-80* windows across the screen can be agonisingly slow.


Highlight 'curve', then 'do it' to get curves

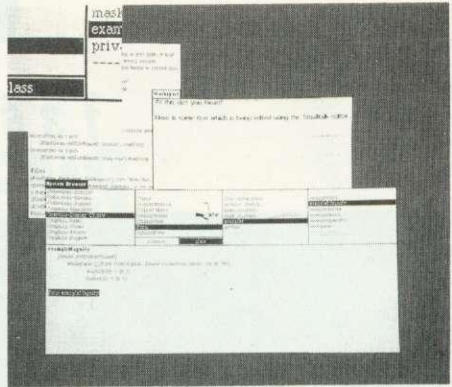
Because of *Smalltalk*'s windowed user interface, the resolution available on-screen is important – the more pixels on the screen, the more usable windows can be opened at once. On ordinary Archimedes monitors, the display is of very limited size and cannot really be recommended. Multisync monitors give some improvement and will be the most common solution, but the ultimate answer is to use an ultra-high resolution monitor of the kind A440s have special sockets for. I have a 19-inch paper-white monochrome monitor which supports the mode 23 resolution of 1152 by 896 pixels so I was able to see *Smalltalk* as it really should be – with a display the size of an A3 piece of paper. This is a tremendous boon, but it begs the question of how useful *Smalltalk* will be to people without the aid of such monitors.

Within the system are a text editor, compiler, user-friendly debugger, browsers and tools for system management. Instead of working 'in' any one of these pieces of software, it's possible to have windows to several of them open at once. Text can be cut and pasted from one window to another and since the entire system is available as source code, it is possible to tailor the system as you want. The huge variety of objects built into the system provides an excellent platform upon which your own applications may be constructed – there are integer and floating-point numbers, arrays, strings, sets, linked lists, files, graphical shapes, bitmaps, screen editors and, of course, the text editor, debugger and compiler.

Smalltalk in education

Much of Xerox's work with *Smalltalk* centred around teaching fundamental computing principles to children using *Smalltalk* – in much the same way that Logo is used. Since then a reasonable sized *Smalltalk* following in education has arisen around the world.

John Ash of Smalltalk Express believes that *Smalltalk* is a good language for teaching computing, because it is conceptually simpler than traditional programming languages such as Basic and Logo. Its object-oriented approach helps to reinforce good programming style, by hiding unnecessary information from the user, and the accessibility of the system source code allows considerable scope for learning by example. The graphical nature of *Smalltalk* is visually appealing, and certainly it is possible to achieve much more sophisticated graphical results with *Smalltalk* than, say, Logo. In fact, Logo is a language whose features could be simulated within *Smalltalk* very easily – and Seymour Papert, Logo's author worked at Xerox PARC in the early days of *Smalltalk*.


Browsing and using the magnifier

Conclusion

The *Smalltalk-80* implementation on the Archimedes 440 is hard to fault. The deeper question of whether is it suitable for educational use must be left to enthusiastic individuals. Until *Smalltalk* becomes available on a greater range of affordable machines, its applications in education will clearly be limited.

Very few primary schools have Archimedes 440s at present. Smalltalk Express is hoping to make a version available on an ARM co-processor card for IBM PC compatibles during the coming year and clearly this will broaden the base of machines.

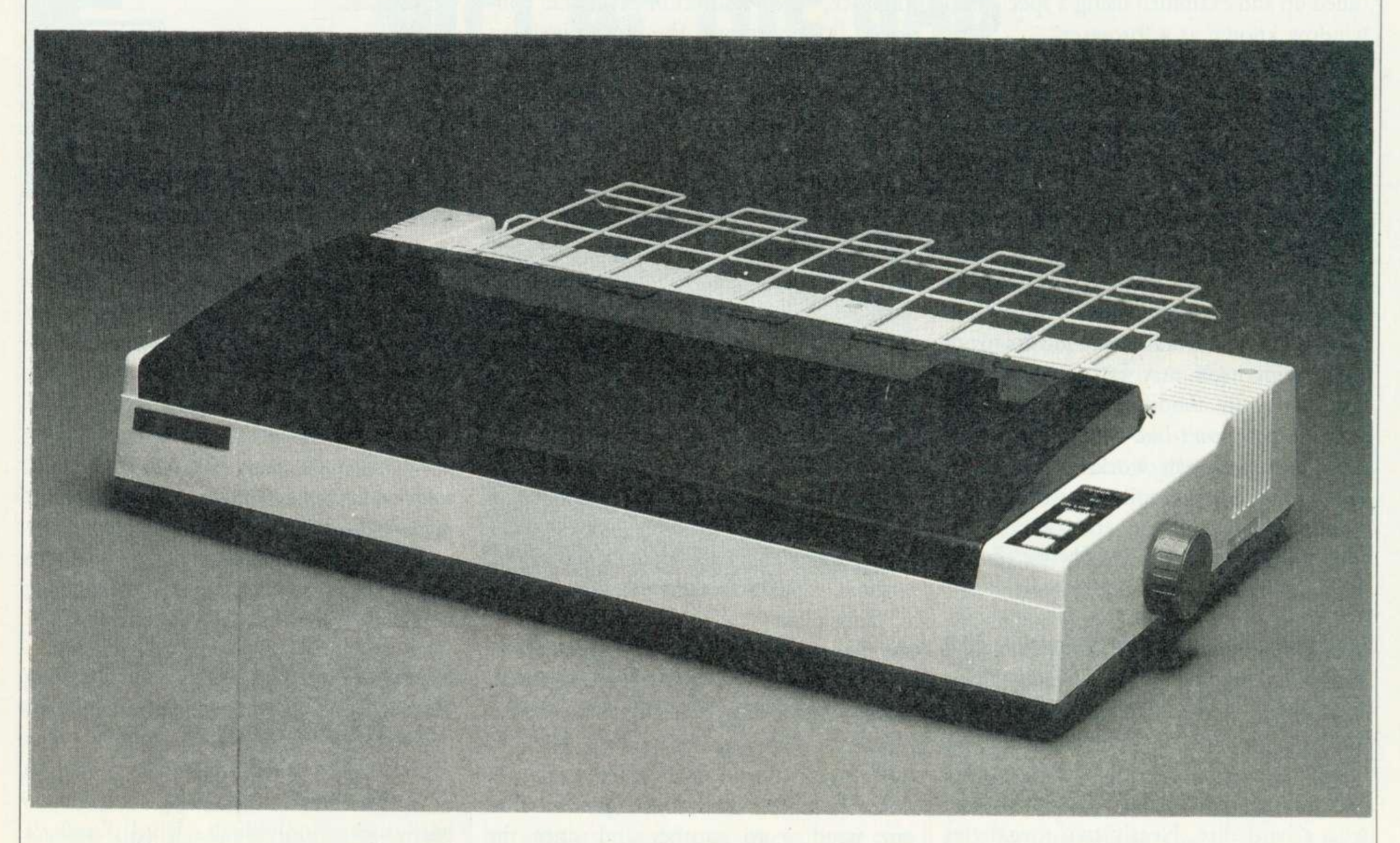
No written review can do justice to seeing the *Smalltalk-80* system working. Even photographs cannot convey the simplicity with which it is operated.

The *Smalltalk* environment has been used to design, prototype or simulate everything from newspaper photo-typesetting systems (by Xenotron) to battle simulations (for the American CIA). Its unique combination of graphical interface and simple, consistent design lend it well to the kind of highly interactive software that so many people seek.

Smalltalk-80 *for the Archimedes 440; £620 from Smalltalk Express, Hyde House, The Hyde, Edgware Road, London NW9 6LA. Tel 01-200 0220. Educational discounts of 50 per cent are available.*

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HARDWARE

THE PLOT THICKENS

A reliable and cheap plotter is not easy to come by. JC Dixon looks at the latest model from Roland and reckons it's a good buy

Even a small plotter can cost in excess of £1000, so it's not a common item for the home user. But most educational establishments could find good use for one, and they're in common use in business for producing both good quality and technical graphics.

The Roland DXY-880A is an A3-size plotter that costs about £700. Unpacking the box, the initial impression is of good quality with reasonably robust construction – although in relation to the cost of a Master or an Archimedes it doesn't seem much hardware for the money. Also in the pack is a mains adapter, manual, reference card, a set of eight different coloured pens, a few sheets of good quality A3 paper, two magnetic strips for paper holding, and a poor dust cover. The Roland follows the traditional flat-bed pattern with the pen moving along an arm, which itself moves side-to-side. The arm locates on two wheels about three inches apart, which seems to be quite rigid enough for good repeatability. A3-size paper can be held in a clip at the left, plus a magnetic strip, but A4 is held better by using the two magnetic strips.

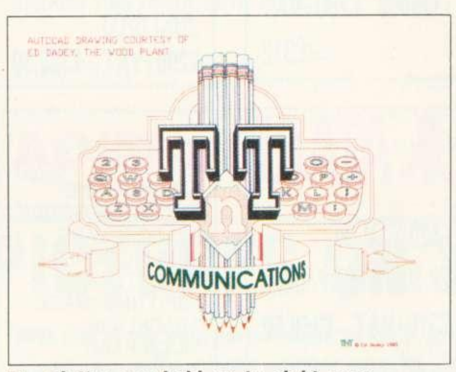
A run of the self-test program shows off typical abilities with multicolour hatched histograms, angled writing of various sizes and so on. The overall size is quite large (21-inch x 17-inch x 3.5-inch) needing an 18-inch wide shelf. You can also halve the width by tipping it up at an angle with a fold-out leg, but this is much less convenient.

The plotter comes with both serial and parallel interfaces. The parallel port connects directly to the BBC's printer port – I used the lead from my Epson printer, and for this a printer switcher would be a boom. The manual doesn't show a suitable BBC micro serial lead – figure 1 shows how it should be done.

A plotter can operate with only very basic commands – to raise or lower the pen and to move to a given point. Like some other plotters, the Roland can do



Roland plotter: well worth considering



The plotter can hold up to eight pens

better than this: single instructions can do quite complex tasks such as circles, hatched rectangles or hatched segments, eg, for pie charts.

The Roland has two sets of commands. The first is a set of single letter commands which are easy to use. The second is the Hewlett Packard graphics language (HPGL). HPGL is more or less the plotter standard, (like an Epson command set for printers), and each command consists of two letters. When operating in the simple mode, HPGL commands can still be used if they are proceded by '^'. Anyone who can use the Basic Move and Draw commands will quickly be at home with the plotter.

The maximum plotting area is 380 mm by 270 mm, with one co-ordinate corresponding to 0.1mm, so the maximum co-ordinates are 3800, 2700. The pen can be limited to an A4 area by the Dip switch at the rear, or an area set by software to prevent plotting off the paper. The commands are sent as strings. For example, to draw to the point 810,420:

```
PRINT "D810,420"
```

To practise the commands, this simple program allows you to type them in and sends them to the plotter:

```
REPEAT
INPUT LINE "Command: "a$
*FX 3,5
PRINT a$
*FX 3,0
UNTIL FALSE
```

In line 20, INPUT LINE is needed so that commas can be included in the commands.

Multiple commands on one line are allowed, separated by a semi-colon. The commands string is ended with a Return. Move and Draw co-ordinates can be sent as integer, real or exponential values, D 810,600 or D 810.6, 600.23 and D 8.106E2, 6.0023E2.

Unlike sending a picture to a dot-matrix printer which is done after the screen picture is complete, the plotter can draw at the same time as the screen. It's best to do this with a PROCdraw that both draws on screen and then sends the equivalent command to the plotter. It could scale the X and Y co-ordinates too, otherwise the picture will only be 13cms by 10cms.

Lettering can be produced using the plotter's internal fonts using the 'P' command: PRINT a$ on screen would be PRINT"P";a$ on the plotter.

Lettering is slow compared with a real printer, about one character per second depending on size. Size, letter slant and text angle are easily set to required values. English letter quality is quite good, although the zero and O shapes are interchanged compared with the BBC screen shapes. The Greek lower case is not so good, being rather small compared with English at a given letter size, or rather angular if enlarged.

The pens themselves are easily changed under software control – sending 'J4'

swaps the current pen for number four. It can hold up to eight pens.

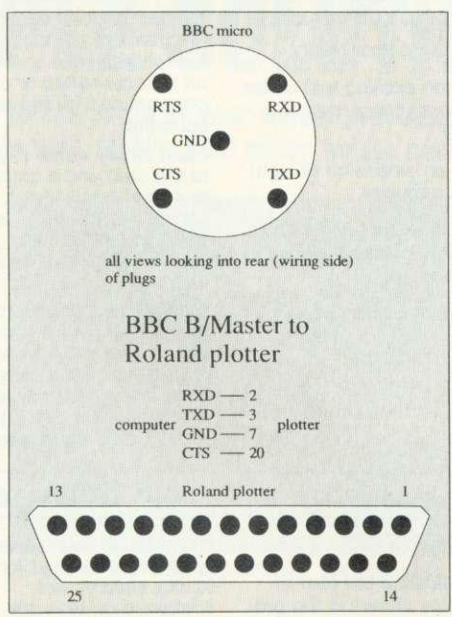
A good range of colours is available with 0.3 and 0.6 mm nibs for paper, plus oil-based pens for overhead projector slides, or ceramic nibs down to 0.2 mm for high quality work.

Facilities are provided to use the plotter as a digitiser. You position the pen with the plotter's own cursor keys then read the position with the HPGL command "OA" – this can only be done with the serial connection, as the BBC's printer port is output only.

```
*FX 2,1
PROCplot("^OA")
INPUT x,y,p%
*FX 2,0
```

reads the pen position into x and y, and p% is set to 1 if the pen is down. For accurate digitising you could make up a 'pen' with cross-hairs, to replace the ordinary ink pen.

The manual is over 100 pages, and fairly clear for the most part – some experiment soon clears up minor queries. As usual, the examples are in Microsoft Basic rather than BBC Basic. One problem is that there is no index: the section which is called an index is just a table of contents.



Suitable BBC micro serial lead

Conclusion

With the reservation that solid filled shapes sometimes give a sightly ragged edge, all seems well with the plotter. Very professional looking pie charts and histograms are easily produced, and with HPGL compatibility, it should work with most commercial software (eg, Lotus 1-2-3 for people with IBM emulators or Master 512s). It has potential for computer-aided design, especially with an Archimedes, and can be used for engineering drawings, printing maps and innumerable other projects.

Verdict: a good plotter with a satisfactory performance. A3 capability at a reasonable price by plotter price standards, although there are cheaper plotters available in A4 size. It's well worth considering for education or business, or affluent home users, who would certainly have lots of fun with it.

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Cheshire Cat **FUN WORDS** includes:-

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Right answers to a problem brings a Cheshire Cat grinning from the screen, a correct tick and a happy tune. Wrong answer and the program gives the unsuccessful child extra help.

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Right answers bring a Cheshire Cat grinning from the screen, who quickly steps in to help the child in difficulty.

Cheshire Cat **ADDER SUMS** includes:-

Multiplication:	Calculate the cost of items shown in the grocer's shop window.
Addition:	Correctly total the shopping bill from the grocers
Division:	Share out the biscuits using the simple technique provided.
Time:	Learn to tell the time of day, days of the week and the months of the year.
Tables:	Make a start or improve on those important times tables.

Sum Takeaway (Maths Level 2) Age 6-7 yrs.

Nineteen flexible excercise programs of games for up to four children are contained on twin cassettes or disk programmed for your home computer.

Each child's name is entered at the start and a complete record of results kept. All games can be set at two ability levels with with up to 100 games for each exercise.

Right answers bring a Cheshire Cat grinning from the screen, a correct tick and a happy tune. Wrong answer and the program gives the unsuccessful child extra help.

Cheshire Cat Sum-Takeaway includes:

Addition:	Full hello to sums.
Subtraction:	Starts with differences and introduces Take Away.
Charts:	Ways of recording information. A vital concept in the child's future.
Tens & Units:	Delightful visual hello to numbers over nine.
Multiply:	First step in those times tables and the 'X' sign.

Sum Measure Age 9-13 yrs.

Six programs with a choice of 6, 10 or 20 questions are contained on twin cassette or disk programmed for your home computer.

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Cheshire Cat **SUM MEASURE** includes:-

Length:	Work out the length of a line in centimetres or millimetres.
Area:	Find the area of a rectangle using cm².
Volume:	Give the volume of a cuboid in cm².
Temperature:	Work out the temperature shown on the thermometer.
Mass:	Read the correct balance scale
Capacity:	Measure the amount of liquid in the cylinder.

Sum Times (Maths Level 4) Age 8-9 yrs.

Nineteen flexible exercise programs of games for up to four children are contained on twin cassettes or disk programmed for your home computer. Each child's name is entered at the start and a complete record of results kept. All games can be set at two ability levels with with up to 100 games for each exercise. Right answers bring a Cheshire Cat grinning from the screen, a correct tick and a happy tune. Wrong answer and the program gives the unsuccessful child extra help.

Cheshire Cat Sum Times includes:

Tally & Bar Charts:	An easy introduction to graphs.
Time:	A moving clock for digital time.
Tens & Units:	Addition & Subtraction of numbers over nine.
Symmetry:	Lines of symmetry.
Co-ordinates:	Important for reading maps and graphs.
Square Units:	Invaluable for calculating areas etc.

and much, much more . . .

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INTERLUDE

AMPLE SOLUTIONS

Ian Waugh solves some of your Ample problems and checks in with all the BBC micro music news

In Basic it's easy for one program to chain another. In Ample, however, direct commands such as Load are processed straight away and it is only the music instructions that are queued. If you've tried to tack a Load instruction onto the end of a piece of music you'll know that it doesn't work.

The solution lies in the use of Ample's QTIME word which is documented in the *Ample Nucleus Programmer Guide* (available from Hybrid at £19). Without going into too many details, when used within a player QTIME will return a positive number as long as that player has notes to play. Listing 1 shows its use within a REP (...)UNTIL(...)REP construction to mark time (using IDLE) until QTIME is less than (#<) -100. The value of -100 gives the last note a short time to play out. The next step is to create a command which will load and run another program. You have probably discovered that Ample will not allow this within a word:

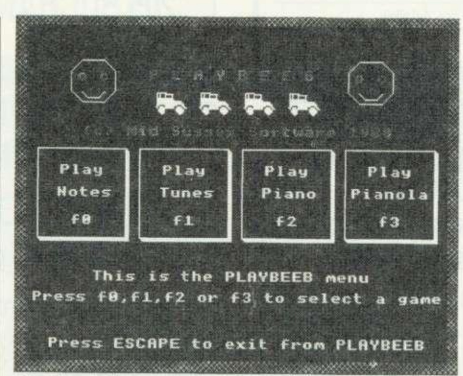
"nextprog" LOAD RUN

The solution is to put the command into a function key and then put the function key number into the keyboard buffer with **FX153*. Notice the use of the double bar character after the function key number. I've chosen Key 7 as it seems the safest. Can you see why?

This now has to be inserted in your program and there are two ways to do it. Remembering that QTIME must be used within a player, create a dummy player, and fill it with rests which last for the length of the piece. The RUN word would then become:

"123456789" PLAY

An alternative approach is to divide the music into sections, make the word, say part1X, and tack it onto the end of the RUN word as shown in listing 2. If you don't normally use sections, simply rename part1 to part1a and so on. As soon as a new piece starts to load, the original music stops playing. I'm afraid I don't know how to load a piece *while* another is actually playing.



Playbeeb: four music games for younger kids

Ample Syntax

Do you have problems remembering Ample syntax commands? Amplinex 008 includes an Ample Nucleus Help Facility which shows the syntax of Ample words. It loads into sideways RAM and it responds to a *Anhe command with three pieces of information. It gives you a description of the word's function (Fn), the inputs and outputs where applicable, (IO), and then the status which notifies if it can be used as a command or inside a word definition (St). For example, *Anhf Voice results in:

Fn: select voice(s)
IO: voicenumber VOICE
St: Command or []

Abbreviations can be used and *Anhf. will list all the words. Amplinex is collating a comprehensive list of Ample-compatible and non-compatible ROMs. If your system is not working as you think it should, a ROM could be causing the problem. An index to Amplinex issues one to six is available from Amplinex in return for a formatted disc, suitable packaging and return postage.

Music notes

■ Alistair Johnson, editor of Dudley College of Technology's excellent on-line Ample database has had to pass the task over to Dave King while he revises for his A-levels. He would like to know if any of our readers would be interested in writing technical articles for the database. Log on by ringing (0384) 239944 or write to the address below.

■ *PlayBeeb* (£6.95) from Mid Sussex Music is aimed at three to seven-year-olds. It is designed to illustrate the concept of pitch and shows robot faces and cars on screen while music is playing.

■ EMR now claims to have more than 25 music programs available for Acorn computers. Sales to the educational market continue to grow and some programs have been endorsed by the Institute for the Blind. Research is being undertaken with a company in Amsterdam to transfer sheet music from page to computer directly by using a scanner.

■ Most Hybrid Music System owners will be aware that the Run command will automatically play parts 1 to 8. If a mix word hasn't been defined it makes a mix containing Simpleins for each part. Early versions of the *Studio 5000* software did not include this auto-run facility. If you have *Studio 5000 3* or an earlier version you can upgrade to the current version free of charge by sending your issue disc plus a re-usable disc mailer and postage and packing to Hybrid Technology. You already have the current *Studio 5000* if you have a Music 4000 – it is included on the disc.

■ Good news for Master owners. Hybrid is planning to release a RAM disc facility (costing around £10), which will hold the overlay modules which are normally loaded from disc in sideways RAM. This will allow instant access to all the editors and you won't need a System disc sitting in your drive, thus freeing disc and catalogue space.

■ *If you have any musical tips you'd like to share, or if there are any topics you'd like to see covered in this column, please write to Interlude,* BBC Acorn User, *Redwood Publishing, 20-26 Brunswick Place, London, N1 6DJ.*

Dudley College of Technology, The Broadway, Dudley, West Midlands DY1 4AS. Mid Sussex Music, 11 Bridle Way, Pound Hill, Crawley, West Sussex RH10 4HP. EMR, 14 Mount Close, Wickford, Essex SS11 8HG. Amplinex, 26 Arbor Lane, Winnersh, Berkshire RG11 5JD.

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(see review in March '89 *Acorn User*)

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LETTERS

BBC Acorn User, 20-26 Brunswick Place, London N1 6DJ. BTG/TTNS 81:RED001

SPEECH THERAPY

Sir, After your mention on page 15 of the March 1989 issue of *BBC Acorn User*, I have received several enquiries regarding my adult basic education software.

The existence of this note came as a complete surprise and I would like to take this opportunity to add several important details.

At the time of writing, I have produced 11 single-sided 40-track discs containing an assortment of programs. One disc in particular contains a selection of 'talking' programs (utilising Superior Software's *Speech*) designed especially for visually handicapped pupils.

Programs can be obtained by sending blank single-sided 40 track discs to me. I can of course put the equivalent of two discs on one 80-track disc. I can also supply the discs themselves at a cost of one pound per disc.

I have supplied copies of my programs to about 130 colleges, schools, prisons, hospitals etc. Awareness of their existence has spread mainly by word of mouth but also by the appearance of details in Microwaveband, the magazine of the organisation CABE — Computers and Adult Basic Education.

Programs and details can be obtained from: Peter Davy, 68 Headlands Road, Ossett, Wakefield, West Yorkshire WF5 8HX.

Peter Davy
Secretary CABE

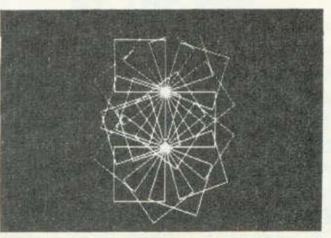
KEEP UP THE SHOW

Sir, I am attempting to break into the computer age to keep up with my two young sons who are using microcomputers at school. I have access to BBC educational software designed for the model B, some of which is ROM based.

Is it possible to run this software, especially Logo, on a 310 Archimedes utilising the 6502 emulator? I would be grateful for any advice.

Peter Warren
Herts

The majority of BBC educational software will run on the Archimedes either in native mode, or under the 6502 emulator. The new emulator supplied with Risc OS, 65Host, will support even more programs than the previous one.



Many *BBC ROMs* will work on the emulator, including the version of Logo. You could of course utilise the power of your Archimedes by buying the Arc specific version of Logo.

This costs £71.87, inclusive from: Logotron Ltd, Dales Brewery, Gwydir Street, Cambridge CB1 2LJ, Tel (0223) 323656.

CRUNCHING WORDS

Sir, I recently bought the November *Acorn User* disc in order to use Joe Telford's Crossword program.

It is too long to run on a Model B as it stands. After crunching the program with Toolkit as recommended, I ran the program and got 'Bad FN/PROC at line 940'.

This eventually led me to the DATA statements at lines 7720, 7730 and 7740. These contain Function names which were changed in the body of the program by the crunching process. In order to get the program to run you must change the function names to match those in the crunched version. For a program crunched with Toolkit Plus the DATA statements must be changed to:

```
7720 DATAP(""),_,`,a(3
),a(2),"Z(""W"",1)",j("W
")
7730 DATAQ(""),b,c,d(3
),d(2),"Z(""C"",1)",j("C
")
7740 DATAe,f,g,T(3),h,
"Z(""X"",1)",j("X")
```

LH Jones
Bedford

ONE LINE SOLUTION

Sir, Having read Agora in the July 1988 issue of *Acorn User*, it occurred to me that the program was actually much longer than is necessary and that it would be useful to have a one-line equivalent. The following one-line program can be incorporated into a single key definition and will run when the key is pressed.

```
*KEY0 DIM drive 12:I
NPUT"Compact which drive
"a$:$ drive=a$:REP.:OSCL
I("Compact "+a$):SYS "AD
FS FreeSpace",drive TO s
1,s2:UNTIL s1=s2:P."Free
 Space is ";s1
```

Obviously users with a single drive system could shorten the program by deleting the INPUT statement and setting a$="0".

The use of a procedure which compacts the disc at the conclusion of a complex operation such as that of compiling programs could be of significant help in avoiding frustrating delays which can actually be caused by the fragmentation of files on the disc.

George Blanchard

NOTIFY THE ARC

Sir, Do you know how I can implement the Econet utilities *View, *Remote and *Notify on the Archimedes, using Filestore Level 3. I have tried them all, under both the ARM operating system and the 6502 emulator, without success. Would it be possible to write them in Basic if they are not available?

John Reddy
Computer Sales Manager
Micro Centre, Dublin

***Notify is supported by Risc OS. *View and *Remote are available from Acorn themselves at the usual address.**

LINE TO BELFAST

Sir, The Belfast Education Board runs a very informative information system called 'BelView', containing the usual mix of news, reviews and help lines. The system has been running for about a year and a half and is proving very successful among callers in Northern Ireland.

Of special interest to Northern Ireland users is that 'HealthData' (produced by Dr Chris Dobbins) is now available at local call rates.

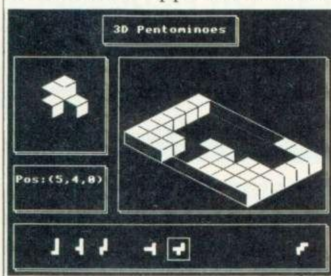
Recently however, British Telecom has installed a new exchange, and therefore the number is different for mainland callers. The new number is: (0232) 325778.

The system operates on a Communitel host with three external phone lines 24 hours a day and runs at 1200/75 baud.

Richard Charles
Belfast Education and Library Board

PUZZLE IT OUT

Sir, I was very impressed with David Lawrence's Pentominoes program in the October 1988 issue of *Acorn User*, and have spent many days puzzling over the various solutions. You may be interested in an article which appeared in *Scien-*



tific American magazine (September 1982) that covered the rules and theory for these sort of puzzles.

Solutions to the original puzzles are as follows. For a box that is 3x4x5 there are 3940 solutions, for a 6x5x2 box there are 264 solutions and for a 103x2 box, there are 12 solutions.

One of the most popular formats is the 10x6x1 box which has 2329 solutions. I have amended the original program to provide this. These are the necessary changes.

```
1000 VDU 28,14,23,38,6,
12,26
1990 PLOT o5,752+(x-y)*
xs,650-(x+y)*ys+z*zs
2070 PROCdrop(14,23,38,
6)
2280 PRINT " 1) 5 x 4 x
 3"'" 2) 6 x 5 x 2"'" 3) 1
0 x 3 x 2"'" 4) 10 x 6 x 1
"
2320 IF k$> "0" and k$<
 "5"
2355 IF k$= "4" xm=10:y
m=6:zm=1
```

This brings the total number of solutions to 6555 which should keep most people happy for some time.

M Galjaard
Netherlands

NO ROOM AT THE INN

Sir, Several months ago you published an article about upgrading the Archimedes 300 series. I have recently bought an Archimedes with a second internal floppy-disc drive fitted. I now need a Winchester drive but there is no longer any room left in my computer. Can you tell me if any company produces the controller podule on its own?

K Ladhani
London

Watford electronics supplies a hard disc controller podule plus 20 megabyte Winchester for £379 + VAT.

You might try using a SCSI (Small Computer Systems Interface) podule. Acorn is producing these for use with the R140 Unix workstation, although third parties should be supplying them soon.

WORDWISE BETTER

Sir, I am surprised there has been little mention of the expanded version of the *Wordwise Plus* wordprocessor in the magazine.

Wordwise Plus 2 is superb, containing all the essential commands that were omitted from the original. There are over 20 new commands, including LEFT$, MID$, RIGHT$ and BIN$ for printing a binary number.

There are four floppy discs included; two contain useful segment programs and one a sorting utility for loading into sideways RAM, and the last a set of programs to allow continuous processing of text as with *Interword*.

Roger King
Guernsey

You can get *Wordwise Plus 2* from IFel, 36 Upland Drive, Derriford, Plymouth, Devon PL6 6BD.

SPLITTING WINCHESTER

Sir, I own a Master 128/512 and intend to use it in a research project. I also wish to use a 30 Mbyte Winchester hard disc. Is it possible therefore, to divide the Winchester into two different formats, ie, 20 Megabytes for Acorn format and 10 Megabytes for DOS+?

Tord Israelsson
Sweden

GET A PACKET OF THIS!

Sir, I have started an informal 512 Users Group on the UK Amateur 'Packet Radio' BBS Network. This enables us to send files and personal or bulletin messages without incurring any postage or 'phone charges!

If any Radio Amateurs active 'on packet' would like to join, then they can contact me by sending a message to G4BLT @ GB7YAX in Wakefield. My callsign is G4BLT and my local BBS is GB7YAX, hence the syntax.

There are no subs to pay, and I send out bulletins as and when I get news together. For example, the next bulletin will refer to the 512 Roundup and PC pointers articles in *Acorn User*.



There is a lot of demand for information about using the RS423 serial port from DOS+ but there are many conflicting rumours on this subject. Can you help?

Richard C Sterry
Wakefield

David Atherton's Comms Column in October 1988's *Acorn User* pointed out *Comm Plus* from Margolis Systems (105 Founding Court, Brunswick Centre, Marchmont Street, London WC1N 1AN) which uses the Master 512 serial port correctly, giving access to both Prestel and scrolling systems via a modem.

Bold Printing

Clean up the quality of your printout with the Juki 6200 daisy wheel printer. With its speed of 30cps, you can create a deep and lasting impression on paper in more ways than one!

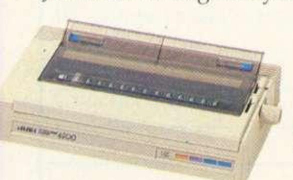
Whatever your printing requirement, the Juki 6200 will produce clean crisp copy everytime and like all of the versatile Juki range, the cost of the Juki 6200 is so economical that the price will wash with just about everybody.

Whilst we wouldn't try to soft soap you into believing that the Juki 6200 can lighten your work load like Bold! We can say that you will be bubbling over with the sparkling printout on your sheets (of paper!)

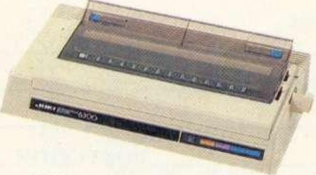


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6500
A high speed daisy wheel printer designed specifically for high speed office use. 3k buffer, proportional spacing, parallel interface.
Speed: 60cps.
Compatibility: Diablo 630API.
Price: £899



7100
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ACORN USER ADVERTISEMENT PAGES – APRIL 1989

ACORN USER'S

DIARY

Better things ahead for Bell

Once upon a time in a faraway land there was a little boy called Graham. He liked lots of things, especially the great outdoors, and grew up carefree among the mountains and bogs. In fact when he was older he decided he liked bogs so much that he spent four years exploring one to see what it was like when bogs were bogs and palaeobiology hadn't been invented.

He found out so much about bogs that he had to buy a computer to look after all his notes while he was away sampling strange microbes and finding out what sheep ate many thousands of years ago. Little did he know what tremendous chain of events this insignificant purchase would trigger.

One day Graham, wandering far in his search for extinct species of creepy crawlies, stumbled across the Redwood Dungeon. The dank habitat and Neanderthal expressions of its inmates reminded him of his studies, and he was lured into taking care of what was known as the Redwood Econet. Mistakenly thinking that it had something to do with preserving wildlife he took charge.

From that moment Graham was a changed man (he was now quite old in years). Mastering a whole new vocabulary he fearlessly tamed the beast that was *Acorn User*, kept the temperamental Econet going even when it was timewarped to furthest Old Street, and still managed to spend five hours a day discussing things quite irrelevant on the phone to anyone who would listen.

After a year or so of this even Mandelbrots and floating points were beginning to seem a little dull. And the Econet was as temperamental as ever. But luckily, an edict was passed down from on high, requiring Graham to begin his travels once more, not this time in search of antique mushrooms but of the latest high tech direct input state-of-the-art publishing stuff. So off he went, leaving the remaining *BAU* goblins (not one over 5'3 inches) to work out how to fit the Druid listings on to the yellow pages and to welcome new editor Geoff Bains.



Below: the young Bell prepares his assault on the intricacies of *ViewSheet*. Left: the Redwood Econet gets the better of Bell.



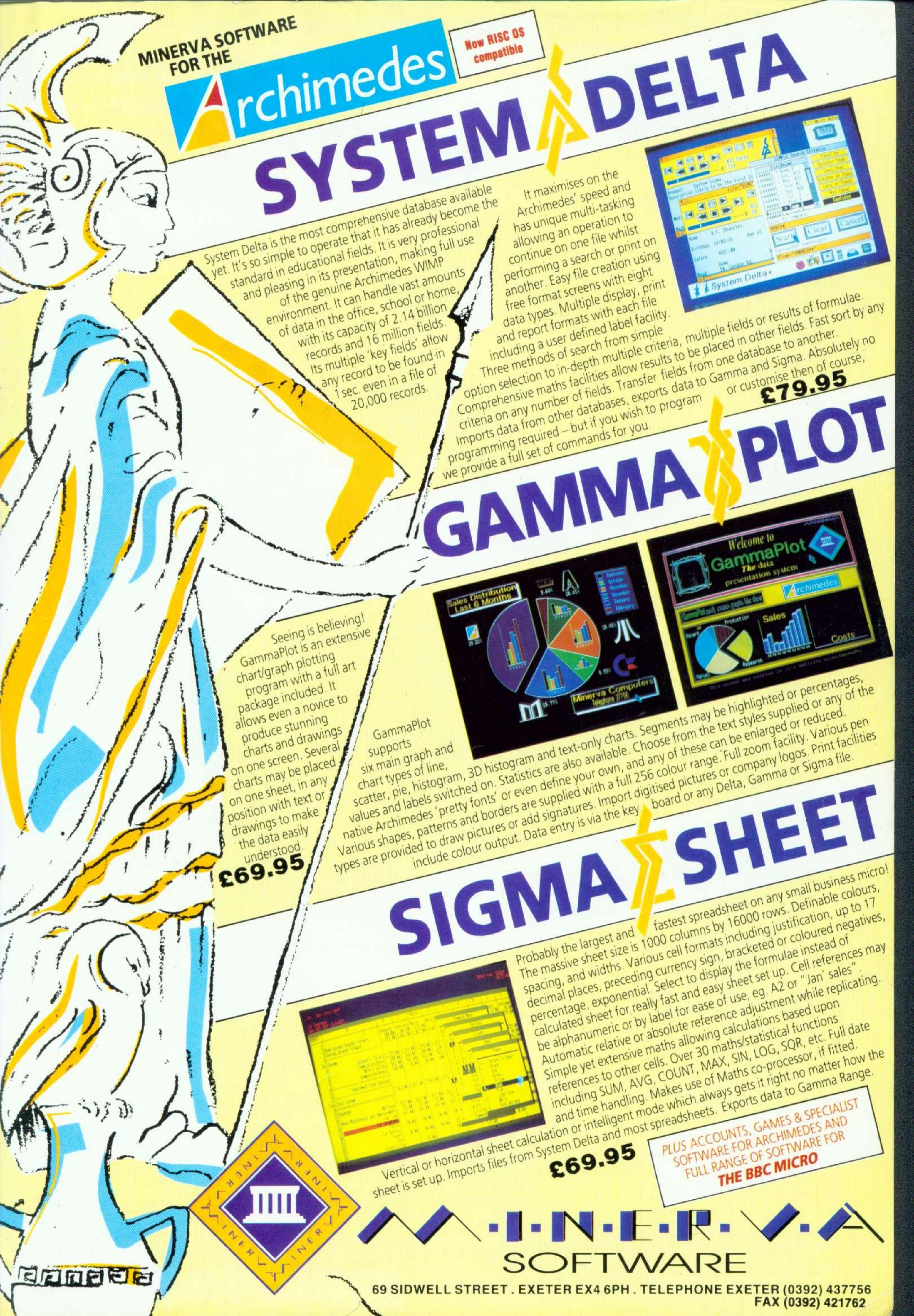
Seen in Cambridge and abused in brief...

A certain air of deja vu has descended on parts of central Cambridge – 4a Market Hill to be precise. Longtime Acorn fans will remember that this is where the fledgling company first spread its wings. So who has been seen popping in and out of its not-so-august portals? Well, Hermann Hauser, Andy Hopper, Paul Bond, and hosts of hopeful computer students looking for patronage. But this time it isn't Acorn but new venture the Active Book Company. Apparently the lunches are good, but the hardware is still a long way off.

Acorn has just announced further standardisation for the development of hardware and software for the Archimedes. Any author wishing to use a word ending in 'ODULE' must now apply to Acorn for a prefix allocation. This is in keeping with their policy on SWI numbers, Error numbers and File types. The following prefix ranges have been defined: A-G – for allocation to software houses, H-P – reserved for Acorn use, Q-Z – free for the user.

Prefixes can be up to 4 characters in length, this is so they will 'fit' in a 32 bit wide ARM register.

If you wish to have your own prefix registered, please write to Abuser's Diary stating why you would like this prefix, and what it stands for.



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At the finale of BARBARIAN - THE ULTIMATE WARRIOR, the Barbarian defeated the warriors of Drax and thus freed Princess Mariana from his evil spell. Drax fled to the dungeons beneath his black castle, vowing to wreak disaster on the Jewelled Kingdom.

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Finally you reach the fourth level, the Inner Sanctum, where you face the Living Idol, the Demon and finally the dreaded Drax!

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(The screen pictures show the BBC Micro version of the game.)

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